The Manitoba Medical Review

Vol. 28 APRIL, 1948 No. 4

GYNECOLOGY

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Induction of Labor

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Induction of labor may be defined as the artificial termination of pregnancy after the foetus has become viable i.e. after 28 weeks of gestation.

In 1608, Louise Bourgeois, who was midwife to Mary of Medici, induced premature labor as a therapeutic measure. In 1756 Smellie performed the same operation. In 1793 Denman reported 20 cases of induction of labor for contracted pelvis by rupture of membranes. He advised this method of treatment for disproportion in preference to caesarean section which at that time had almost a 100% mortality.

Later, induction of labor was advocated whenever the life of mother and baby were thought to be in danger. More recently, with the advent of prenatal care, all kinds of indications for induction of labor were found. There was a tendency to terminate pregnancy whenever some complication was found during the last 2 or 3 months of pregnancy. The easiness with which it could be performed made it very popular. Today, it seems, induction of labor has almost become routine treatment in certain hospitals, mostly for the convenience of the patient or the doctor.

In a recent article entitled "Elective Induction of Labor" in the Am. J. of Ob. and Gyne. (September, 1947), Grier reports an incidence of 15% inductions in the Evanston Hospital. At the Chicago Lying-In, the incidence is 7%. Although induction of labor is a fairly safe procedure in properly selected cases it is not without risks.

Professor Browne reported that of 173 maternal deaths in 9 British maternity hospitals staffed by experts 5% (or 1 in 20) followed directly on induction of labor and that the operation adds ¼% to the average death rate of labor.

The last Manitoba Pregnancy Survey from May 1st, 1938 to May 1st, 1940, showed a total of live and still births of nearly 28,000. There were 89 maternal deaths—giving a maternal death rate of 3.26 per 1,000 live births.

The causes of death are listed as follows:

Abortion	20
Toxaemia of Pregnancy	17
Accidents of labor	17
Hemorrhage	16
Sepsis	15
Ectopic	4

In the 17 cases listed under accidents of labor there were 5 inductions. No figures are given for inductions in toxaemia of pregnancy, haemorrhage and sepsis. In his report Dr. McQueen states: "The frequency of induction is also noteworthy and one is left with the impression that quinine and pituitary extract cannot, without risk, be used indiscriminately for induction of labor." "Though undoubtedly some of these labors were difficult, one gets the impression that some were made difficult by indiscriminate induction on supposedly post-mature cases and that, in some cases at least, the judgment used was not of the best."

The reports on maternal morbidity following induction are as high as 25%. The fetal mortality and morbidity after induced labor are also above the average. Therefore it should be used only when there is a definite indication.

Now what are the complications which are seen more frequently after induction than after spontaneous labor?

1. Prolapse of the cord. It is reported to occur about 3 times more frequently in induced cases. I have had 2 cases of partial prolapse of the cord in induced cases, but fortunately the cervix was fully dilated and I was able to apply forceps and deliver the head immediately. Both babies survived.

2. Infection, due to vaginal manipulation, especially after using tubes, bags or packing.

3. Prolonged labors, when the cervix is not ripe i.e., when the cervix is not effaced, undilated, thick and rigid. This occurs most frequently when the induction is done sometime before term.

4. The use of oxytocic drugs such as pituitary extract and quinine carries a definite hazard. To mention a few of the main complications:

Rupture of uterus; Laceration of cervix, vagina and perineum; Increased B.P. and cerebral haemorrhage; Precipitate labor; Tetanic contractions; Contraction ring, retained placenta, increased postpartum haemorrhage; Intracranial injuries to the baby.

Rupture of the uterus has been known to occur after an injection of 2 minims of pituitrin. Five grains of quinine may also cause tetanic contractions and if used in large doses, as was the custom not so many years ago, it may cause deafness of the foetus.

5. From a legal standpoint, if labor is induced simply for convenience and the mother or baby

dies and a suit is brought against the obstetrician, I wonder what the judgment would be. To say the least it would be an uncomfortable position to be in.

It is well known that many cases of maternal deaths reported were induced for some definite indication and no doubt some of these mothers would have died from the condition under treatment such as placenta praevia, accidental haemorrhage or toxaemia, but a number of these deaths could have been prevented. In other words, too many inductions are done for trivial reasons.

Usually induction of labor is done between the 30th and 38th week of pregnancy. Before the 30th week the baby has very little chance to survive. From the 30th week on his chances of survival increase roughly 10% per week until he has reached maturity at 40 weeks.

Before inducing labor we should ask ourselves two questions:

(1) **Will the patient be better off with the uterus empty?**

(2) **Will the baby have a better chance to survive after an early delivery?**

Some particular cases require careful examination, long experience, a good deal of thought and obstetrical judgment before a decision is arrived at, but in general the indications for induction of labor are fairly well defined and are fewer today than they were 20 years ago.

1. Toxaemia of Pregnancy, includes pre-eclampsia, eclampsia, chronic nephritis and hypertension. This is the most common indication for induction. We must evaluate the seriousness of the toxaemia and its effect on both maternal and foetal life before we decide when is the best time to terminate pregnancy. One of the most important parts of prenatal care is to recognize toxaemia early and to treat it accordingly. After one or two weeks treatment if there is no sign of improvement, depending on the severity of the case and the nearness to term, an induction of labor should be considered. Certainly a case which is followed closely should never be allowed to go into convulsions.

Eclampsia usually occurs during the last four weeks of pregnancy and at that time the baby has a good chance of survival. Therefore induction of labor should not be deferred, it should be done early. Cases of fulminating types of eclampsia are reported in the literature for which caesarean section is advocated but I have never seen a case where the signs of impending eclampsia could not be detected soon enough to induce labor and prevent convulsions. If a patient is first seen in convulsions she should be treated medically at first with sedatives and intravenous glucose, then the membranes should be ruptured. Rupturi the membranes often stops the convulsions or d creases their number and violence. Due to i creased irritability and tonicity of the uteri muscle they usually go into labor soon after a labor progresses fairly rapidly. Medical inducti with castor oil and quinine is not reliable and tak too long to act. Pituitrin (and even pitocin) a contra-indicated especially if there is mark hypertension on account of the danger of cereb haemorrhage. Very rarely a bag may have to used to hasten delivery, a procedure which I ha done only once since I am in practice.

We know that chronic nephritis and essent hypertension are progressive diseases and th pregnancy increases the kidney damage marked We know also that the disease is aggravated every subsequent pregnancy. In these cases t onset of toxaemia is more insidious and appea earlier in pregnancy, usually around the 6th 7th month. Most of these cases can be carri on medical treatment—rest, diet, sedatives, un the baby is near term or until the cervix is ri There may be some improvement at first but t patient is still toxic and the signs may reappe at any time. This patient should be watched ve carefully and at the first sign of recurrence aggravation of signs and symptoms she should induced by rupturing the membranes.

In moderately severe cases it is unwise to car them on medical treatment too long because t continued albuminuria may cause permanent da age to the kidneys and the foetus may die in ute In severe cases with marked hypertension oede and albuminuria pregnancy may have to be te minated as early as 28 to 30 weeks.

2. Placenta Praevia. In cases of margi placenta praevia when the cervix is soft and 2 more fingers dilated, induction by rupture membranes followed by the application of a ti abdominal binder is the treatment of choice. T bleeding usually stops when the presenting p presses on the separated edge of the placenta. had a case some years ago: the patient, a mul para, came in the hospital almost exsanguinate no pulse, no B.P. On admission a vaginal exami tion was done, a marginal placenta praevia w diagnosed, the cervix was thick and hard, fingers dilated. The membranes were ruptur artificially and the bleeding stopped. Plasma a transfusions were given, 6 hours later the pati had sufficiently recovered to take her to Operating Room and caesarean section was do It was a twin pregnancy, one baby was dead, other alive. In this case rupture of membra was a life saving procedure.

Sometimes Willetts forceps is applied to scalp to maintain pressure or in case of a bre

traction on a foot to control bleeding. Very rarely a bag is used.

Central placenta praevia or even marginal placenta praevia with slight dilatation, rigid cervix and severe bleeding are best treated by caesarean section.

3. **Abruptio Placenta.** The general opinion now is that this condition can be treated conservatively, i.e., by rupturing the membranes, applying a tight abdominal binder and by small doses of pituitrin. The patient is also given glucose-saline intravenously and transfusions.

If, after a period of 6 to 8 hours, labor has not started, or if there is no sign of progress, or if there is evidence of severe haemorrhage, indicating a complete separation or Couvelaire uterus, a caesarean section is indicated.

4. **Polyhydramnios.** This condition is often associated with some malformation of the foetus, such as anencephalic monster, spina bifida, hydrocephalus. An X-ray should be taken before induction to give us some idea of the size of the foetal head. When the distention of the uterus causes cardiac or respiratory embarrassment the membranes should be ruptured by a small puncture and the fluid allowed to drain off slowly. Then a binder is applied. The danger in these cases is prolapse of the cord. They usually go into labor readily, because the cervix is effaced and partially dilated. Very rarely pituitrin is necessary to initiate labor pains.

5. **Twin Pregnancy.** Many of these patients go into labor spontaneously before term and many of them are toxic. The main indication here is toxaemia, occasionally overdistention. Rupture of membranes is done to induce labor.

6. **History of Habitual Death of the Foetus** at or near term. Induction done 2 or 3 weeks before the usual time when the foetus died in previous pregnancies will often result in the birth of a normal baby. The method used preferably would be rupture of membranes combined with medical induction.

7. **Post-Maturity.** First of all we must admit that there is no absolute, positive method of determining if the foetus has gone over maturity. We have to rely on the date of L.N.M.P., on the date of first foetal movements felt, on the size of the baby, on X-ray, on engagement of the head and on the condition of the cervix. It is easy to make an error of 2 to 4 weeks in our calculations. For this reason post-maturity has been disregarded during recent years as an indication for induction in many hospitals. But undoubtedly there are cases which go 3 or 4 weeks over term, in which labor is difficult and prolonged due to a hard head which will not mold and impacted shoulders. Sometimes the baby may die before labor. In multiparas, with a history of large babies, I believe that induction of labor should be done at term by medical induction and rupture of membranes.

Case—Mrs. M., multipara, babies 10 to 12 pounds, advised induction at term, husband refused, confined 4 weeks over term, baby 13 pounds, 7 ounces, difficult labor-impacted shoulders, baby died.

8. **Disproportion.** This indication for inducing labor before term has also been given up during recent years. It is true that the weight of the baby increases most rapidly during the last month of pregnancy but the size of the head does not increase in proportion to the body. At 40 weeks the average circumference of the head is 14 inches, at 36 weeks it is 13 inches. There is a difference of 1 inch in circumference, or 1/3 of an inch in diameter. A premature baby of 8 months is more susceptible to intracranial haemorrhage, especially if the mother's pelvis is moderately contracted. It is also very difficult to estimate the amount of disproportion in borderline cases, even with an X-ray. We are unable to predict the strength of uterine contractions and the amount of molding which the head will undergo.

We often see a small woman, weighing 100 pounds, deliver without any trouble an 8 or 8½ pound baby. Therefore these borderline cases should be allowed to go in labor spontaneously, and after a trial of labor of 12 hours, we should be able to form an opinion as to the possibility of delivery from below or decide on a low caesarean section. Mechanical induction of labor should never be done if the possibility of a caesarean section is contemplated.

9. **Ruptured Membranes** on admission without pains. Most of these patients will go into labor within 12 hours but there are some who may go several days before labor begins. The fear of infection after prolonged rupture of membranes has been the main reason for inducing labor in these cases.

I have seen 5 cases where the membranes were ruptured for 1 month or more and none of these mothers had any post-partum infection. 4 of them were delivered at 6 to 7 months, all babies died after birth. In the other one, the membranes ruptured at 4 months, she lost some amniotic fluid daily for 1 month, then it stopped. She delivered a normal baby at term. When the patient is at term, when the head is engaged and the cervix is ripe, as a general rule these cases are better induced with small doses of pituitrin and a tight binder. When the cervix is closed, thick and hard, it becomes more of a problem. During recent years at the Chicago Lying-In they have adopted

a policy of not inducing these cases of ruptured membranes. The patient is allowed to be up and around and vaginal instillations of 1% merthiolate in glycerine are made every 12 hours until the patient goes in labor. They claim better results with this type of treatment.

10. Systemic Diseases such as severe anaemias, Pulmonary Tuberculosis, Heart Disease, Diabetes.

As a general rule the disease should be treated first and pregnancy allowed to go to term, with the possible exception of diabetes.

Tuberculosis and heart disease usually improve towards the end of pregnancy and nothing is gained by inducing labor before term. When the patients are at term and the cervix is ripe induction of labor may be done by rupturing membranes or by medical means. For diabetes better results are claimed for the mother and baby if a caesarean section is done at 36 weeks, but many obstetricians let these patients go to term and induce them by rupturing the membranes.

11. Induction for the Convenience of the patient, the relatives or the doctor, also called elective induction of labor or "pre-week-end inductions." This type of obstetrics should be condemned in general. It might be allowed for multiparas who live in the country and have to wait in the city until labor begins, who are at term with the head engaged, the cervix effaced and partially dilated, i.e., in multiparas when labor is imminent. But before inducing labor in these patients it is well to remember that accidents may happen no matter how carefully the cases are selected.

Methods of Induction

They may be divided into medical and mechanical. The choice of procedure becomes a matter of judgment and depends on many factors, such as the urgency of the particular case, the engagement of the head, the condition of the cervix, etc. Induction by drugs is slow and unreliable if done before term, when the cervix is not ripe. Induction by mechanical means is more rapid with less chances of failure.

Medical using castor oil, enema, quinine pituitrin and estrogens. There are many variations of this method.

The method I have used since 1934 is the following:

C.O. 1 oz. at 6 a.m. When bowels have moved—S.S. enema. Quinine sulphate gr. 3 o.h. 1 for 3 doses. Then pituitrin m 1; 30 minutes later, min. 2; 30 minutes later m3. These small doses of pituitrin should be given with a tuberculin syringe. If there are no pains 4 and 5 minims may be given. During the last 5 years I have discontinued the use of C.O. and the 4 and 5 minim doses of pituitrin with just as good results. If there is no pain after the 3rd dose of pituitrin it may be repeated in 3 minim doses once or twice.

Drugs should be stopped at any stage of the induction when regular labor pains are established. The patient should be in the case room when pituitrin is being given, she should be watched by a competent nurse or interne, a mask and ether bottle should be ready. If she has very strong contractions an anaesthetic should be given.

The danger of this method lies mainly in the use of pituitrin.

Its success depends on the condition of the cervix. If the cervix is effaced, thin (¼ inch or less), soft and dilated to 1 or 2 fingers, the head engaged, it will work in over 75% of cases. If it fails there is no harm done to mother or baby. A tight abdominal binder will greatly increase the success of this method of induction.

The use of estrogens or stilboestrol has been found to be practically useless for the induction of labor.

Mechanical. Rupture of membranes is the easiest, safest and most successful method of induction of labor. The patient does not need an anaesthetic usually. If she is nervous she is assured that the procedure will not be painful. The perineum and vulva should be cleansed with soap and water and some antiseptic solution, such as Dettol, is poured over the introitus. A long blunt probe is used. There is no necessity for stripping the membranes from the cervix. The condition of the cervix and the station of the head can be immediately ascertained by the examining finger. After the membranes are ruptured and some amniotic fluid is seen escaping a tight abdominal binder is applied.

If the cervix is ripe, i.e., effaced, thin, soft, one or two fingers dilated and the head fits well against the cervix, contractions usually begin within 1 or 2 hours and the duration of labor is shorter than normal. Occasionally the onset of labor pains is delayed and small doses of pituitrin may be given to initiate contractions.

A combination of medical induction plus rupture of membranes is more effective in bringing on labor pains but pituitrin should be used with caution. The danger from infection is only slight if done under aseptic precaution, but it increases if the onset of labor is delayed.

The insertion of rectal tubes and packing as a method of induction has been discontinued many years ago and has no place in modern obstetrics. It was a dangerous method due to greater risk of infection carried up into the uterus, separation of the placenta, haemorrhage or even perforation of the uterus. It was also very ineffectual. The insertion of a Voorhees bag into the uterus is

has some limited indications but it is being used less than some years ago. It is useful in the following types of cases:

1. In cases where other methods are contra-indicated or where they have failed to bring on labor.

2. To act as a slow dilator of the cervix.

3. In cases where the presenting part is high up.

4. To control bleeding in placenta praevia when caesarean section or internal version is contra-indicated.

Induction of Labor at Chicago Lying-in Hospital

Dieckmann, W. J., Am. J. Obs. & Gyn., 54, 496, 1947

The modern concept of induction of labor at the Chicago Lying-in Hospital is here in described.

The artificial termination of pregnancy after 32 weeks by induction of labour, is invariably associated with increased fetal and maternal morbidity and mortality no matter how carefully cases are selected. In the Author's long experience of Obstetrics, maternal deaths following induction were due to infection or to hemorrhage and shock. Fetal deaths were due to prolonged labor, infection, injuries or prolapsed cord.

The primary consideration in their opinion prior to any induction, is whether the patient is better off with the uterus empty, or, if the fetus is alive and in good condition, is its chances of survival increased by early delivery.

The indications for induction in the Author's estimation, are selected cases of placenta praevia, abruptio placenta, eclampsia and non-convulsive Toxemia of pregnancy. Induction was not used in the treatment of post maturity and contracted pelves. The guide to all inductions was the condition of the cervix.

A vaginal examination, using sterile technique, preceded all attempts at inducing labor. Careful evaluation of the pelvis, determination of the presenting part, and exclusion of a concealed cord prolapse, as well as the condition of the cervix was all determined.

The cervix must be "ripe"—in a primipara, that is one in which there is complete effacement, and the cervical margins are 0.5—1 cm. thick and soft. In a multipara one in which there is 2 cm. or more dilation and soft. Castor oil or castor oil and quinine have no place in induction. Medical induction, if chosen, using posterior pituitary extract in small doses, will fail, if the cervix is not ripe and dilated 1 cm. In the case of a surgical induction, the membranes should be first stripped, then ruptured. Rupture of the membranes is the simplest and safest means of induction.

In the hemorrhagic groups, patients should be delivered vaginally if possible, without undue hemorrhage. In Toxemic patients the condition of the cervix and the severity of the Toxemia must be evaluated. If the latter permits delay the cervix will change and permit relatively safe induction of labor. Induction for post maturity, contracted pelves, or convenience of the doctor is contra indicated. Patients with systemic disease such as cardiac, T.B., severe anemia, diabetes, etc., should have labor induced as soon as the cervix is ripe.

Induction for cases of cephalo-pelvic disproportion was not done. For borderline disproportion an honest "trial of labor" was given, if still no progress, then Caesarean section. With section as safe as it is today, no fetus should have its life jeopardized, or suffer permanent injury, by induction of labor. The Authors condemn the use of bougie, pack, stomach or rectal tubes or intra or extra ovular injection of ether.

The incidence of attempted induction on the Author's service was 3.2% and of failure 9%. If the cervix was ripe, labor was successfully induced and delivery completed within 24 hours in over 80% of the patients.

F. W. Crealock.

SURGERY

Edited by S. S. Peikoff, M.D.

Diagnosis and Treatment of Gall Bladder Disease*

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Gall bladder disease can usually be diagnosed on a clinical basis when it is frankly and fully developed. The classical features of such an advanced state include attacks of severe pain or colic associated with restlessness and requiring morphine for relief. The pain generally is felt in the right upper quadrant, and may radiate posteriorly to the scapula or shoulder. Vomiting may be present. Jaundice may occur without a stone in the common duct and be due to inflammation or dysfunction of the adjacent tissue. It may be obvious or subclinical when its presence can be detected only by laboratory means. Following the attack, residual tenderness is noted in the gall bladder area. So frequently are the attacks produced by, or are coincident with the use of articles of a fatty nature that the patient may develop a fear of food, and his reduced diet leads to a steady decline in weight. For years, the cholecystogram has supported or helped to rule out the diagnosis of gall bladder disease with a high degree of perfection. More recently the introduction of improved dye, the standing position and increased speed of exposure have increased the incidence of correct diagnosis in each direction.

It is the surgical treatment of such advanced disease of the gall bladder in which all the clinical criteria for operation have been met which is acknowledged to be so successful. Here there should be a full measure of agreement, not only in diagnosis but in treatment. There are, however, other lesser degrees of gall bladder involvement where a conflict of opinion as to the ideal method of therapy may exist. The solution will probably never be decisive or simple, and the individual cases must be decided on the basis of certain distinctions.

It is well known that many persons may conceive gall stones and remain unaware of their silent presence for years until some unrelated event discloses them. A certain proportion are found to have stones, during the course of an examination, because of some complaint not associated with gall bladder disease. In many of these cases, the question must arise as to whether surgical intervention is warranted. It is, of course, impossible to foresee which of this group will remain free of trouble until the end of their time, and who will at some period develop a full blown picture of gall bladder disease—as some must. Of these latter, the effects may develop gradually, and assistance can be sought in an elective manner. On the other hand, others may be suddenly stricken at such a time or place or age that treatment is not available or satisfactory, and there follows a prolonged and dangerous illness which may terminate unsuccessfully.

It is no doubt impractical to advise the removal of all silent gall stones when discovered. This is so despite the easy technical problem and the fact that the morbidity and mortality would be reduced almost to a fantastic figure in such cases. There are obviously good reasons to contra-indicate such a practice. How worthy and justifiable these reasons continue to be held will vary, doubtless, with what recent experience the medical and surgical consultants have had with some of the more advanced and serious states of gall bladder disease. Nothing can be more worrying or unsettling than the care of such a case when the successful outcome hangs in the balance. This is especially so when the patient is precipitated into trouble after a period of successfully getting by on the counsel that silent stones are innocent stones. It is following an unhappy example of this nature that both physician and surgeon are likely to believe that never again will they permit themselves to suffer such a trial. However, so changeable is human nature that in time this attitude softens, and silent gall stones are allowed to rest in peace, and it is only with a further bitter experience that the resolve to remove all calculi is reborn.

Some day possibly the prophylactic removal of all gall stones may be widely practiced and without criticism. By analogy one might point to the treatment of adenoma of the thyroid. In the large centres great experience has taught that a certain proportion of these undergo changes which are toxic or malignant. The teaching has further spread that it is reasonable to remove the great majority of these before a condition arises which may imperil the patient, despite the fact that many would remain unaffected if left alone. Similarly, the urologist should show little hesitation in dealing with a symptomless stone discovered by accident in the renal pelvis because of the fear of possible consequences. Much the same argument may be directed to the repair of hernia, which in the early stages is so successful.

As already noted, it may be impractical to advise removal of all silent stones. Nevertheless, it is well to distinguish between certain conditions. Thus a normally functioning gall bladder by

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* Read before the Annual Meetings of the Saskatchewan, Alberta, and British Columbia Medical Associations during September, 1947.

cholecystogram, containing one or two moderately large cholesterol stones, represents a less urgent problem than such an organ containing multiple small stones. The great danger obviously in the latter case is the possibility of a small stone entering a duct and causing obstruction with major ill effects. Such a situation is regarded by some as a definite indication for operation, and the argument appears reasonable, despite absence of symptoms. Generally it may be argued that other future hazards due to gall bladder disease will be reduced. These include, in addition to biliary obstruction, acute cholecystitis, which may progress to gangrene and perforation, too often carcinoma, which almost invariably is associated with gall stones, cirrhosis of the liver, pancreatitis, and possibly serious effects from cholecystitis having some relationship to a greater degree of arteriosclerosis. As a basis for concern regarding silent gall stones was the finding in a recent series of choledochotomies at the Winnipeg Clinic. Of thirty cases of common duct stone, 50 per cent had had symptoms referable to the biliary tract for less than one year.

Another problem involves combinations of mild or moderate symptoms suggestive of gall bladder disease. In such cases may be found a functioning gall bladder with one or more large cholesterol stones or a gall bladder which functions poorly or not at all in the cholecystogram. None of the urgent symptoms of gall bladder disease has been present. The treatment of these cases constitutes a problem. Although cholecystectomy may be indicated because of the presence of stones alone, this measure does not always produce the symptomatic relief expected. The resultant disappointment must be shared alike by patient and doctor, and too often the lack of improvement is attributed to the surgical procedure and not to the true circumstances, namely, the possibility of associated conditions.

The presence of more than one abnormal condition is not uncommon in patients of middle age or over, and they may be functional or organic in nature. Frequently, coronary heart disease, oesphageal hiatus hernia, gastric and duodenal lesions, pancreatitis, appendicitis and diverticulosis of the colon may in their way mimic cholecystitis. Furthermore, mild gall bladder disease may be associated with but not always responsible for hypermotility of the stomach and irritable colon.

It is well known that gall bladder disease may simulate coronary heart disease, and the reverse is also true, while the two conditions may exist together. It is, therefore, proper in the older patient who has some hypertension and some evidence of arteriosclerosis and whose heart is enlarged in the routine chest film, to obtain an electrocardiogram. The evidence of a recent myocardial infarction may change one's mind tow the part played by the gall bladder regarding attack of epigastric pain associated with so m gas and relieved by soda. The problem is a s stantial one as evidenced by the fact that at Mayo Clinic in 25 per cent of cases of ang pectoris gall stones are present. It has been vised by Barnes[1] that when angina pectoris cholecystitis co-exist, the surgical attack on gall bladder should be performed only if the sy toms of cholecystitis are severe and unendura if the risk of operation is recognized as consid ably increased, and if little prospect is held to the patient that the surgical procedure will lieve him of angina pectoris.

Because so many of these cases present a hist suggestive of gall bladder disease, a cholecystog is the most likely roentgenological procedure be performed in their investigation. Howe since the full truth has been missed so often, principle is that because in upper digestive t disease one condition may simulate or mask other, or more than one lesion may be present, examination is not complete without both a bar meal and a gall bladder visualization. From experience, cholecystitis is a common associ of hiatus hernia, occurring as it does frequently older and obese patients. The incidence of condition is over one per cent of all cases w symptoms referable to the biliary or upper gast intestinal tract[2]. It is interesting to note that per cent of our cases of hiatus hernia had und gone cholecystectomy before a diagnosis of her was made and their symptoms had failed to relieved in a satisfactory manner. It is reco mended that the oesophageal hiatus be examin during the abdominal exploration performed every case of cholecystectomy to determine if opening is abnormally large.

Another cause for the post-operative persiste of these symptoms which led to cholecystecto is the presence of a peptic lesion apart fr gastritis. The association of peptic ulcer in bladder disease as found in a review of 277 rec cases undergoing cholecystectomy was betwee and 4 per cent, and in some series the incide is higher.

The condition of irritable colon may prod symptoms as variable as those of cholecysti Common complaints according to Wilkinson[3] clude epigastric distress, gas, belching, distent and abdominal pain. The last is usually refer to the sigmoid area, but may be felt in eit colonic flexure. One of the chief symptoms constipation, the stool being fragmented or ins sated. The condition may be associated w hyperacidity or achlorhydria, which in turn produce sourness, gnawing sensations, nausea, perhaps vomiting. The barium enema genera

will reveal little to assist the diagnosis in a specific manner. Diagnostic, perhaps, is the relief of pain which usually follows flatus escape.

Where the diagnosis of gall bladder disease is not supported by a history of colic or jaundice, the possibility of spastic or irritable colon should be considered. Certainly in such cases the urgency for surgical intervention is not great. Time is available for a therapeutic trial of the methods considered useful in the treatment of this condition. The frequent improvement in symptoms, it has also been observed, may be associated with the return of gall bladder function, as evidenced by the normal cholecystogram.

In view of the foregoing, it is therefore well to reserve one's judgment as to the part played by a diseased gall bladder if the picture is not supported by a classical symptom complex of gall stone colic. If it is not present, it should be accepted that possibly only a partial diagnosis has been established, and although it is known that 50 per cent of all those patients suffering from indigestion have gall bladder disease, there may exist in a large proportion a combination of exciting factors. This, then, is a plea for thorough investigation of cases. It is not meant to detract from the decision to remove gall stones, which is based upon other principles. Rather it is an attempt to avert disappointments and to prevent discredit from falling upon the operation and the operator by failure to fulfill what has been so eagerly expected by the patient.

Pre-Operative Preparation

The need for complete diagnosis to determine the possibility of associated conditions has already been mentioned. Despite the fact that the mortality in cholecystectomy has been greatly reduced in the uncomplicated type of case, it still remains high where other unusual factors exist. Only by close attention to details will these difficult cases be treated successfully. Chronic pulmonary sepsis, cardiovascular disease, anaemia and impaired liver and renal function must be kept in mind and corrected if possible. Where a major complication looms as a possible result of surgery, the judgment of the medical consultant and the surgeon should be reached with care, and operation delayed to permit optimum preparation.

In the event that the need for cholecystectomy follows a prolonged and perhaps serious illness, the factor of malnutrition may be present and protein reserves be depleted. This possibility may be suspected where the diet has been inadequate or if there has been vomiting. A diet rich in protein or supplemented by the parenteral administration of amino acids to provide up to 150 grams of protein should be available. The main difficulty is to secure adequate caloric intake which will prevent amino acids, which are necessary for tissue building, from being deflected to meet energy requirements. Therefore, free use of glucose should be made. In the liver it is converted into glycogen, and held there if thiamine chloride (Vitamin B_1) is available in satisfactory amounts. The possibility of haemorrhage in case of liver damage associated with obstruction and jaundice is controlled by the intravenous or oral administration of Vitamin K. By such methods the liver and other tissue may be supported and recover in the face of the ill effects of disease and faulty nutrition, and thus an important hazard in gall bladder disease may be eliminated.

The Technique of Cholecystectomy

The technique of cholecystectomy has been well developed. Most surgeons practice the same procedure employing minor variations. In the uncomplicated case usually little difficulty arises, but where anomalies are present or where extensive pathology exists, good judgment must support technical skill in the solution of the problem. Generally it is felt that a right paramedian incision of generous length, namely from the xiphisternum to below the level of the umbilicus is satisfactory. Thus space is obtained to permit proper exposure of the gall bladder and the bile ducts. A small incision with limited visibility may obscure the field and lead to an accident, while nothing is gained by this economy except possibly some flattery to the surgeon's prowess. The subcostal incision of Kocher is no longer commonly used, but in the obese patient with wide flaring costal margins it may be of distinct advantage. Surgeons also differ in their method of actually removing the gall bladder. Thus it may be preferred that this be done from the cystic duct outward or from the fundus down to the cystic duct, and each method has its advantages. It is felt that less bleeding and so better visualization and less hazard result from the dissection and control of the cystic artery and duct at the outset. Concerning the cystic duct and artery, certain problems may arise because of anatomical variations.

Arteries and Ducts

The anomalies of the bile ducts and branches of the hepatic artery as they are related to the dissection of the gall bladder are well known because of the special studies on this subject. The brief review of this subject which follows is based upon the investigation of I. M. Thompson, Professor of Anatomy at the University of Manitoba[4]:

(a) The right hepatic artery

1. In seventy per cent of cases it arises from the main hepatic trunk and reaches the liver by passing behind the common hepatic duct.

2. In twelve per cent of cases the right hepatic artery crosses anterior to the hepatic duct or even the common duct.

3. In ten per cent of cases the right hepatic artery may be closely associated with the cystic duct and the neck of the gall bladder. It could be easily included in the clamp applied to the cystic duct.

4. In eight per cent of cases the right hepatic artery crosses the right border of the hepatic duct or even forms a ring around the hepatic duct.

(b) The cystic artery

1. In eighty-eight per cent of cases there is a single cystic artery and in eighty-two per cent of cases it arises from the right hepatic artery.

2. In a few per cent the cystic artery arises from the gastro-duodenal artery. It must cross the common bile duct to reach the gall bladder. If injured, it may retract considerably and the source of bleeding be difficult to determine.

3. In most cases the cystic artery arises to the right of the main hepatic duct. In twenty-seven per cent of cases the cystic artery arises to the left of the hepatic or common duct and must cross one of each to reach the neck of the gall bladder. In two per cent, the cystic artery passes behind the main hepatic duct and should it retract the duct may be included in the forceps.

4. In twelve per cent of cases there may be an accessory cystic artery of variable origin. Failure to recognize such an additional artery may lead to serious haemorrhage.

(c) The bile ducts

In about seventy-five per cent of cases the cystic duct joins the hepatic duct at something like a right angle. In seventeen per cent, the ducts pursue a parallel course before they unite. They are bound together by fibrous tissue and it may be possible to dissect them from each other for as much as two inches or more. The point of actual union may be only 0.5-1 cm. above the ampulla. In eight per cent the cystic duct spirals in front of the hepatic duct before they unite—or the cystic duct may run for a distance behind the hepatic and enter its left side.

(d) Accessory bile duct

This is found in eighteen per cent of cases. It usually arises from the right lobe of the liver and lies at a deeper plane than the cystic duct at first. The accessory duct may join the right hepatic duct at a relatively high level and be out of danger. It may enter the surgical field because its union is near that of the cystic and common ducts and therefore it is exposed to injury. Finally, it may enter the junction of the cystic and common hepatic ducts in such a manner as to avoid detection but not injury.

Actually, although the incidence of anomali appears high from anatomical studies, one reco nizes or encounters them in a surprisingly sm proportion of cases. The great concern, of cours is that an anomaly may pass unnoticed, eith through unnecessary haste or where the positi is too obscured by the results of disease to perm a free view of the tissue under consideration.

Accident or oversight may lead to the produ tion of three serious conditions during the disse tion of the cystic duct. The first of these is inju to the common hepatic or common bile duct. It known that the great majority of benign stricture result from a surgical accident occurring duri cholecystectomy. The reasons for such a complic tion include poor anaesthesia with impaired wor ing conditions, an incision that is made too sma and the effects of long-standing disease and inflam mation. Very often the history of the operati reveals that the case was a most simple one to In such an instance, the surgeon may employ undu haste and fail to observe proper precautions. In other cases there may be an extensive haemorrha from a torn cystic or anomalous vessel. In de peration, the anxious operator may blindly see to control the bleeding with a haemostat. T bleeding point may be controlled in this way, b often the forceps is found later to be across t common or hepatic duct. The great danger in t very easy case arises when the gall bladder lifted upwards and, where the cystic duct is sho the common duct may be tented and a forceps placed across this angulated portion which pr vides the illusion of being the cystic duct. T damage is aggravated by the application of ligature which in turn involves more of the com mon duct.

Safety in clamping the cystic duct demand proper exposure and lighting. There will no doub be less bleeding if the removal of the gall bladd is commenced at the cystic duct with early contr of the cystic artery in order to reduce or avoi haemorrhage. Once the cystic duct is found, should be dissected free of its surrounding tissu until it reaches the common duct. Both the late and the hepatic duct should be distinguished bel and above the junction. When the clamp is fina applied, the gall bladder and the cystic duct shou be relaxed to prevent any tenting of the comm duct. In this manner the possibility of any i volvement should be prevented. Should it damaged and the injury recognized, immedi repair is indicated.

The second condition involves extraordina haemorrhage during cholecystectomy due to injur to two vessels. The first of these is the ri hepatic artery. This structure is occasionally closely related to the cystic duct and the ne of the gall bladder that it may be torn during

dissection. It is said that loss of the right hepatic artery leads to a fatal outcome in fifty per cent of cases. The other vessel which might be unrecognized and traumatized is an accessory cystic artery of obscure origin. A well known and frequently described manoeuvre is a satisfactory method for control of bleeding. The hepatic artery can be palpated and compressed by placing the finger in the foramen of Winslow and the thumb over the artery long enough to remove the accumulation of blood and visualize and control the bleeding point with accuracy.

Finally, a cause for persistence or recurrence of symptoms of cholecystitis following removal of a diseased gall bladder relates to an unusually long cystic duct which may sometimes be present. Such a duct may be so intimately bound to the common duct that the condition cannot be distinguished readily. If it is suspected, it may be demonstrated by passing a probe through the cut end of the cystic duct to explore its length. The lengthy remnant may produce symptoms because of the presence of a stone or chronic inflammatory changes. Our experience with this condition includes four cases which required secondary operation following cholecystectomy. The pre-operative diagnosis in these instances was stone in the common bile duct. The findings revealed that the remnant of the cystic duct had become dilated to such a degree that it resembled a tiny gall bladder. One contained a calculus, and sandy material was found in the remainder. Tissue examination revealed chronic inflammatory change. Relief of symptoms followed their removal.

A further problem in surgery of the gall bladder may be the necessity of exploring the common bile duct. The indications for this procedure may be based upon the patient's history. Thus the characteristic combination of colicky pain followed soon by jaundice which varies in intensity and possibly chills and fever, is likely evidence of a common duct stone. However, a review of cases of common duct stone actually removed at operation demonstrates that this group of symptoms may be wholly or partly absent. Thus, in a series of two hundred and nineteen cases of this condition reviewed at the Mayo Clinic in 1939, it was noted that jaundice was absent in nearly thirty-five per cent of cases[5]. In addition, fever and chills were not a complaint in an even larger proportion of cases. Further criteria, therefore, must be sought in deciding if interference with the bile duct is necessary. This can be determined only by a careful examination of the cystic and common ducts at the time of the operation. The experienced operator is familiar with the normal calibre of these structures. Therefore if the well known clinical picture of common duct calculus is absent and even if one cannot palpate a stone in the cystic or common duct, yet if the lumen of the cystic duct is larger than usual or if the common duct is dilated, exploration of the latter is indicated. If this principle is followed, the finding of unexpected stones will more than compensate for the additional work involved in exploring all ducts when definite and suggestive changes are noted even though stones may not always be found.

When the abdomen is opened on a diagnosis of gall bladder disease, peptic ulceration or chronic appendicitis, the surgeon should be prepared to encounter almost any type of disease. He may expect to find one or all of these three conditions present. This is so despite the most careful pre-operative investigation. It is not uncommon to discover at cholecystectomy a badly inflamed appendix which would be dangerous to leave. Removal through the gall bladder incision may be difficult. In such a case a separate incision may simplify the situation. The pancreas, which is an unsatisfactory organ to investigate, is capable of providing surgical problems which may be encountered at cholecystectomy. Thus pancreatitis and carcinoma of the head may be the cause of biliary obstruction. In such cases the need for anastomosis between the gall bladder or the common bile duct and the gastro-intestinal tract must be met. Recently, despite a normal cholecystogram, I planned a cholecystectomy because of severe colic and vomiting in a fourteen-year-old girl. The gall bladder was normal, but a cyst in the head of the pancreas was found. The symptoms were relieved following drainage of the cyst.

The finding of a gastro-duodenal lesion at cholecystectomy is relatively common, and it is also relatively common for the operator to overlook it. Carcinoma of the stomach is an unpleasant surprise, especially if the barium meal has been negative. Nevertheless, the operator should be prepared to perform a resection. A stenosing duodenal ulcer may be satisfactorily treated with gastro-enterostomy supplemented by sub-diaphragmatic vagotomy. The approach for the latter from a right rectus incision is difficult but possible. The exposure can be improved by performing a transverse incision across the epigastrium to meet the centre of the original incision. Formerly an uncomplicated duodenal ulcer was usually left alone, and often the patient's symptoms continued because of it. Now the combination of cholecystectomy for a diseased gall bladder and sub-diaphragmatic vagotomy for duodenal ulcer without obstruction should not be considered a prohibitive undertaking.

In conclusion, a plea for earlier surgery in the treatment of cases suffering from biliary colic is still indicated. Delay in these cases is responsible for the continuing high degree of morbidity and mortality which still exists across the country in

contrast to the satisfactory operative results in earlier treated cases. The development of fine technique and operating ability and the advances in anaesthesiology cannot at times match the ravages of disease.

Often these cases require an urgent operation without proper time for preparation. The surgeon may then be faced with a procedure that must be performed with despatch because of some associated disease while the gall bladder situation has become difficult and requires a time-consuming dissection. The result must be an incomplete operation, or else the undertaking is completed in the face of serious danger to the patient.

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PAEDIATRICS

Edited by S. Israels, M.D.

Etiology of Congenital Malformations

Extracts From the Literature

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Congenital malformations are defects in structure present at birth. They may be gross or microscopic, familial or sporadic, single or multiple, hereditary or non-hereditary. Teratology, the science of congenital malformations, has until recently been a neglected field in pediatrics. The treatment of defective children who survive is most often symptomatic with poor results. It is self evident, therefore, that prophylaxis, where possible, would be the ideal treatment.

At birth the child has passed through one of the most important periods of his life. A single cell the zygote weighing about five one thousandths of a milligram, has developed into a highly differentiated organism, consisting of nearly 15,000,000,000,000 cells and weighing 3,000 gms. L. L. Burlingame estimates that in the prenatal period 44 successive cell divisions take place and that only 4 additional cell divisions are required to change the newborn to adult size.

The speed in which cell division takes place is greatest in the first eight weeks of prenatal life, during which the zygote is being converted into a fetus. It is necessary to realize the importance of this early organogenetic period for all the organs and organ systems are essentially determined in these early weeks. During the haste of the early developmental processes, errors occur and chances of repair are slight. The greatest majority of the irreparable congenital malformations are established in this organogenetic period.

Many etiological factors may combine to produce congenital malformations, but they will be discussed separately herein.

The causes of abnormal development to be discussed here may be classified as follows:

A. Genetic Factors.

1. Mutations induced by radiation.
2. Mutations induced by chemical treatment.
3. Somatic mutations.

B. Environmental Factors.

1. Nutritional factors:
   Nutritional disturbances.
   General starvation.
   Omission of single nutritional elements.
2. Chemical factors.
3. Endocrine factors:
   Sex hormones.
   Mongolism.
   Insulin.
4. Actinic factors.
5. Infectious factors:
   Syndrome of maternal rubella.
   Mongolism.
   Toxoplasmosis.
6. Mechanical factors.

A. "Genetic Causes of Maldevelopment"

It has been thoroughly established that the basic laws of inheritance apply also to mammals including man, and that certain pathological traits are inherited in the same manner as normal characters. In cases of a typical hereditary malformation, an abnormal gene appears by mutation with or without apparent cause.

1. Mutations Induced by Irradiation.

There is unquestionable evidence of existence of agents by which mutations and consecutive hereditary malformations can be produced. Exposure of mature sperm or ova to X-rays before fertilization results in abnormalities of development. When these abnormalities reappear in succeeding generations it is plain that the cytological changes induced occurred in the hereditary elements[1]. Irradiated male mice had offspring with hereditary malformations of brain, eyes, face, e

tremities and urogenital tract. These abnormalities have been followed through many generations[2]. This and other work raises the question whether or not therapeutic irradiation of the ovaries or the testes of man could be the cause of abnormal offspring by producing mutations. Damage to the offspring by mutations induced in the germ cells must be differentiated from non-inherited damage due to the embryo having been irradiated in utero. The former may not be apparent until several generations hence. The latter, definitely known to produce malformations will be discussed later.

There is no direct proof that irradiation of the maternal ovaries preceding conception produces abnormalities in the offspring. However, several authors recommend caution and protection of the gonads from unnecessary irradiation. The chief problem is, therefore, to determine whether present exposure levels contribute unfavorably to the genetic well being of the human race. Schubert points out in this connection that in the production of mutations only the total dose counts regardless of the size and intervals of single doses, whereas Muller gives a maximum daily dose which he considers safe. No objection to diagnostic doses as used for roentgenograms has been raised. Most authors agree that while maldevelopment has been proved to occur only when mature sperm cells have been irradiated shortly before fertilization, greatest caution should be exerted and the gonads of persons in the reproductive age protected from roentgen rays.

2. Mutations Induced by Chemical Treatment.

Stockard and co-workers describe in the offspring of alcoholized guinea pigs a hereditary inferiority resulting in a reduced number of offspring and early death of many young[3].

The offspring of guinea pigs affected by lead poisoning have been examined[4]. They show a reduced birth weight, an increased death rate during the first post natal week, and general retardation of development. When the lead treatment ends, the gonads recover, and the new progeny is normal.

3. Somatic Mutations.

This is a controversial and possibly highly important genetic cause of localized developmental anomalies. This means that during development of the embryo a mutation arises in one cell and is transmitted only to the descendants of that cell, which are thus genetically different from all other cells in the body. Cases in which this appears to have happened at the first division of the fertilized egg cell are most striking, and one-half of the body differs from the other in some genetically determined character. Examples are gynandromorphism[5], unilateral gigantism[6] and unilateral pigmentary anomalies[7]. Another field in which somatic mutations have been taken into consideration is that of cancer[8].

While this is not the time to discuss theories of genetics it suffices to say that observations contain a certain promise of preventive measures, since they lead to the conclusion that the expression of abnormal hereditary tendencies may be regulated by environmental changes.

One must be careful in ascribing human defects to the known modes of inheritance due to poor and complicated methods of study and relatively short pedigrees. However, Joseph Warkany states that the following congenital malformations are said to be inherited according to a dominant mode:

brachydactylism	microphthalmia
polydactylism	cataract
syndactylism	optic atrophy
cleidocranial dysostosis.	neurofibromatosis
cleft palate	multiple telangiectases
cleft lip	spherocytosis
multiple exostoses	sicklemia
achondroplasia	polycystic kidneys
ptosis of eyelids	

The following according to a recessive mode of inheritance:

polydactylism	spina bifida
microcephaly	dislocation of hip
anencephaly	microphthalmia
oxycephaly	optic atrophy
acrocephaly	albinism
cleft palate	hermaphroditism
cleft lip	imperforate anus

B. "Environmental Factors in Maldevelopment"

1. Nutritional Factors.

Adequate nutrition of the embryo is an indispensable requirement for normal development.

(a) Nutritional disturbances. The term nutritional disturbance used broadly means faulty implantation of the ovum, diseases of the placenta, interruption in umbilical blood flow, dietary deficiencies and transmission of toxic substances to the embryo.

In a thorough study of pathologic embryos, Mall found that in the majority of cases the chorion was diseased and he concluded that normal ova, as a rule, were converted into monsters if their normal connection with the maternal organism was interrupted. The fact that in ectopic pregnancy normal ova frequently become abnormal supports the theory of faulty implantation as a cause of malformation.

Some etiological factors may act by interfering with the local blood supply of the affected parts, with resulting nutritional disturbances. It has been suggested that in prenatal rubella the virus acts on vascular tissue primarily and that pathologic

changes of the hyaloid artery interfere with the nutrition of the fibres of the lens thereby causing cataract (Swan and Coworkers). Congenital amputations also are attributed to vascular and local nutritional disturbances of affected areas and there is evidence also that injuries caused in the embryo by radium and X-ray are of comparable origin (Bagg).

Maternal dietary deficiency may also induce malformations in the young. There is no way at present of estimating how frequently maternal dietary deficiency is actually a factor in the etiology of mammalian monsters and not all types of maternal nutritional deficiency result in congenital malformations (Warkany).

(b) General starvation. General starvation before conception leads to sterility. If starvation begins in early pregnancy, the embryos die and are resorbed or aborted. Starvation in later stages of pregnancy may permit continued gestation but some of the offspring are stillborn and their weight reduced.

(c) Omission of single nutritional elements. Congenital malformations can be induced by omitting single nutritional elements such as vitamins, or minerals from the maternal diet while maintaining a sufficient caloric intake. The deficiency, to disturb formation of embryonic organs, must affect mother and offspring in the organogenetic period of gestation. It is said that a borderline deficiency is required to produce malformations; a slight improvement may result in a normal offspring, while a further deterioration may lead to embryonic death.

i. Copper deficiency. Bennetts and Chapman report that ewes fed a diet deficient in copper may give birth to abnormal lambs. The newborn lambs are unable to stand or obtain milk from their dams. Those that are able to get up sway and collapse and their hind quarters seem paralyzed. The condition has been termed "swayback." Innes considers the disorder to be a process of demyelinisation, in some respects analogous to schilders disease in man.

ii. Iodine deficiency. Manifestations of prenatal iodine deficiency have been described in horses, cattle, pigs and lambs. According to Smith 1,000,000 pigs were lost in the United States in 1917 because of prenatal iodine deficiency. They are born full size with underdeveloped and brittle hooves and the heart has a persistent foramen ovale. Smith showed that these defects can be prevented by giving iodine preparations to the pregnant sow.

In many countries an endemic form of cretinism occurs in children which is attributed to maternal iodine deficiency. As a rule the mother of this type of cretin is goitrous but since endemic cretinism is not found in all areas of endemic goit it is suggested that in addition to maternal iodi deficiency there are other etiological factors.

iii. Vitamin A deficiency. Maternal vitamin deficiency may result in sterility, fetal death, or the birth of dead or weak young. According Evans, Warkany and Nelson, congenital anomali of the young may be observed under certain co ditions, the congenital blindness which occurs the offspring of animals fed a diet deficient Vitamin A, being the subject of most investig tions so far.

Hale fed gilts of known stocks a diet deficie in Vitamin A for 150-200 days before breeding a during the first thirty days of gestation when f mation of the eye is completed in the pig. T diet was then supplemented by cod-liver oil make possible the successful termination of pre nancy. The sows farrowed offspring who we blind due to anophthalmia or microphthalm They also showed other malformations such accessory ears, cleft lip and palate, subcutaneo cysts and misplaced kidneys.

iv. Riboflavin deficiency. In 1941 Warka and Nelson reported that when female rats we reared and bred on a deficient diet one-third their young had congenital skeletal malfo mation The diet consisted of yellow corn meal, wha gluten, calcium carbonate, sodium chloride a viosterol. Malformations of the young consist in shortening of mandible, tibia, fibula, radius, a ulna, of ribs and of sternal centres of ossificati fingers and toes, and of cleft palate. To prov the nutritional origin of these malformations so female rats of the same strain were bred on adequate diet, while others were bred on t original diet supplemented by 2% dried liv None of the offspring of either group showed a normalities of the pattern of those with the fi diet. Further experiments by Huxley and DeBe showed that the pattern produced by diet No could be prevented by riboflavin, a result in a cordance with the fact that the original diet poor while liver is rich in riboflavin.

Attempts were then made to ascertain in whi phase of the development the fate of the affect structures was decided. By means of several e periments it was assumed that in the 13th or 14 day old rat embryo there is a critical stage wh presence or absence of sufficient riboflavin h a decisive influence on embryonic developme Warkany says that at about this time most of t affected parts of the skeleton undergo rap changes, undifferentiated mesenchymal structur developing into the well differentiated me branous skeletal elements which are the for runners of the cartilaginous and osseous skelet A deficiency in riboflavin apparently impairs th

change from mesenchyma into membranous skeleton.

v. Vitamin D deficiency. Maxwell, Lin and Kuo have observed congenital rickets in infants. Warkany induced congenital malformations in the offspring of female rats fed a high Calcium and low phosphorus diet lacking Vitamin D. The mothers were also deprived of ultraviolet radiation. Curving of the radius, ulna, tibia, and fibula, as well as abnormal angulation of the ribs occurred. in the offspring.

2. Chemical Factors.

Much of the early work was done on the fish, fundulus heteroclitus, and striking modifications of development were obtained. Werber[9] obtained by administration of acetone or butyric acid, cyclopia and various malformations of eyes, ears, olfactory pits, mouth, central nervous system, heart and vessels, fins, tail and body form.

The teratogenic effect of chemical substances was demonstrated to be related directly to their toxicity through experimentation on chick embryos. Specific monstrosities could not be attributed to the chemical composition of the substance. Féré concluded that the effect of chemical agents depended largely upon the time of action and that the same injurious factor might cause sterility, monstrosities, abortion, stillbirth or congenital debility according to the developmental stage at which the injury occured.

Stockard's work confirmed these conclusions showing that a typical anomaly could be experimentally produced by several chemically different agents. He found that the defect was the result of the arresting effects of the various substances on a particular developing organ. Disturbance of a part during a critical developmental stage results in malformations which as a rule cannot be repaired by subsequent growth.

Recently drugs have been tested in order to determine whether, if used during pregnancy, they might endanger the embryo. Sulphanilamide[10] was tested in rats. The concentration being equal in the maternal and the fetal blood and higher than that used in therapy. Prolonged administration increased the mortality before and after birth. The birth weight was diminished and postnatal growth retarded. Penicillin has no detrimental effect on the embryo[11].

3. Endocrine Factors.

Dependence of reproduction upon proper and co-ordinated hormonal influences makes it probable that endocrine disturbances may cause malformations. Experiments so far have chiefly demonstrated that abnormal hormonal stimuli deform the sex organs of embryos but there is some scanty evidence that development of other organ systems of the entire embryo may be rendered abnormal if the maternal endocrine glands are diseased.

(a) Influence of sex hormones. Green and coworkers have done most of the work on embryonal sex inversion by abnormal hormonal stimuli. Administration of large amounts of crystalline sex hormones to the pregnant rat will produce sex inversion and congenital malformation of the genital tract in the embryo.

i. Androgens. Administration of androgens has little effect on male embryos, but it inhibits differentiation of female sexual structures in female embryos and stimulates differentiation toward the male type. The female modified by androgens is thus an intersex with the ovaries, oviducts, uterus and an upper vagina of the female, and epididymides, vasa efferentia, seminal vesicles, prostate, a male type of urethra and the penis of the male.

ii. Estrogens. In the male embryo administration of estrogens inhibits the male type of development and stimulates the female type in all structures except the gonad. In female embryos maternal administration of estrogens causes marked enlargement of the uterus and precocious development of the nipples.

(b) Mongolism. A correlation between increasing maternal age and frequency of the defects has been established in mongolism and other congenital anomalies, but there is no proof that hormonal factors cause the malformations.

Van der Scheer considered anomalies of the maternal uterine mucosa to be the cause of mongolism; in the older mother the endometrium may become atrophic and the implantation of the ovum disturbed.

Geyer considers anomalies of the ovum as the cause of mongolism; abnormal ova are formed during menarche and climacterium which develop into mongoloid children.

Jenkins, combining the evidence pointed toward germ cell, and to maternal age, as etiologic factors, formulated the hypothesis that mongolism is due to diminished viability of the ovum.

(c) Influence of insulin. The fetal and neonatal mortality rate of infants of diabetic mothers is high. The use of insulin has increased the fertility of diabetics and the maternal mortality has been markedly reduced. However, abortions, stillbirths and neonatal deaths are frequent and according to Lawrence and Oakley the fetal mortality is 40%. Also congenital malformations occur more often than in non diabetic mothers.

The findings of Miller, Hurwitz and Kuder point to an endocrine imbalance which seems to begin before the diabetic phase. Increased birth weight, cardiomegaly, hyperplasia of the adrenal

glands, and increase in eosinophilic cells in the anterior pituitary, found in infants of diabetic mothers have also been observed in infants whose mothers were non diabetic at the time of delivery but who developed diabetes later. Thus an endocrine imbalance related to diabetes, seems to be responsible for one type of reproductive failure which includes congenital malformations.

4. Actinic Factors.

Solberg[12] has reported on fish embryos that were exposed to roentgen rays. Uniform malformations can be produced through properly controlled irradiation.

Many of the common severe malformations such as cyclopia, have been reproduced in chick embryos by localized roentgen ray destruction[13].

Experimentation with pregnant rats has yielded the following observations[14]. Hydrocephalus resulted most frequently from irradiation on the ninth day, ocular abnormalities from that on the tenth day, and malformations on the jaws from that on the eleventh day. This differential action is probably due to an effect of radiation proportionate to the rate of growth at a given time and place. That roentgen rays have their predominant effect on cells in mitosis is well established.

Malformations have been induced by actinic interference in man inadvertently when pregnant women were irradiated for therapeutic reasons. It should be understood that these malformations are not hereditary, in contrast to those caused by mutation after irradiation of germ cells, referred to previously.

Zappert, who collected twenty cases of roentgenogenic fetal microcephaly, stated that the syndrome was without doubt caused by X-ray irradiation of the pregnant mother. He found that in each family the malformations occurred only in the irradiated child and that in the majority of cases the mother was exposed to irradiation during the first trimester of pregnancy. This was the first proved example of malformations induced by environmental injury in man.

It has been found since that well over fifty per cent of irradiated embryos suffer severe damage. It has been suggested that pregnancy be interrupted if through unfortunate circumstances the embryo has received therapeutic doses of roentgen rays.

5. Infectious factors.

(α) Syndrome of maternal rubella. Within the last few years it has been discovered that maternal rubella during the first two months of pregnancy may result in congenital cataract, congenital heart disease and other defects in children.

Gregg, an Australian opthalmologist, was the first to notice this fact. During 1941 an unusual number of cases of congenital cataract usu bilateral, came to his attention. The children w small, ill nourished and difficult to feed. Mic phthalmia was often present and a coarse nys mus developed several months after birth. calculating from the date of the children's bir he concluded that the early period of pregna corresponded with the period of maximum tensity of the very widespread and severe epide of the "so called German measles" which prevailed in Australia in 1940. Gregg's deduct proved correct, his cases being supplemented his colleagues and further cases were reported Swan from Australia in 1943 and 1944. In U.S.A. identical congenital syndromes follow maternal rubella were reported by many writ

The congenital heart disease which is part of prenatal rubella syndrome, was found to be pr ent in many of the affected children. Harsh s tolic or systolic-diastolic murmurs are hear thrill can be felt and enlargement of the h detected clinically. A number of the children ported by Swan and colleagues were reported d mute. Also microcephaly and mental deficie were frequently found.

Each of the symptoms enumerated may be only congenital defect in a child or they may oc in various combinations.

The manifestations in cases that have come light since the first reports appeared, differ li from the original syndrome although cloudy c nea, glaucoma, and a shallow chamber w occasionally observed. It remains to be s whether hypospadia, obliteration of the bile d deformed kidneys and mongolism which occasi ally occur in combination with the prenatal rube syndrome are accidental findings or not. Ev observed that the majority of children with t syndrome have anomalies of the teeth, such enamel hypoplasia and pointed incisors. Wark found that delayed eruption of teeth and ca were also frequently found.

Carruthers in a thorough study of congen deaf-mutism in the prenatal rubella syndrome post mortem examination, revealed that the mid ear, the eighth nerve and spiral ganglia were parently well formed but that the organ of C was not developed, the tectorial membrane not developed and Reissners membrane was found.

Gregg's observation "that the mother had s fered from the disease early in her pregnancy m frequently in the first or second month" was p inent, since in man the organogenetic period terminated by the end of the second month.

Nothing is known of the mode of action of rubella virus.

According to Swan and colleagues, almost 10 of the mothers who contract rubella in the first

months of pregnancy will give birth to infants with congenital anomalies.

Since rubella rarely occurs twice in the same person and furthermore since the chances of its occurring within the first two months of a subsequent pregnancy are minimal, the parents of children with this syndrome can be assured that there is practically no chance of their having another defective child like the one deformed by the rubella virus.

(b) **Mongolism.** Ingalls and Gorden state that in 9 of 11 reported instances of intercurrent infections, complicating pregnancies productive of mongoloid children, the infections centred in the second or third month. Three of the nine were rubella, the others included influenza 3, purulent otitis media 3, and mumps.

(c) **Toxoplasmosis.** Prenatal infection with the protozoon, toxoplasma, may result in congenital malformations. Among the manifestations of the disease which results from intrauterine infection, hydrocephalus, microcephaly, microphthalmia, persistent pupillary membrane and chorioretinitis can be reckoned as congenital malformations.

Such malformations are not the result of arrested development in the period of organogenesis, but rather the outcome of a prenatal disease which affects the fetus in the growth period.

The parasite, according to Wolf, Cowen and Paige, probably reaches the brain and other organs of the fetus through the placenta, but toxoplasmosis in the mother of affected children has not been demonstrated.

6. Mechanical Factors.

In man and other mammals intrauterine development reduces the occurrence of mechanically caused malformations to a minimum. In the early phases of teratology mechanical explanations were favoured for almost all malformations and narrow amniotic bands and adhesions were usually indicated as being the cause. Today the incidence of these factors is found to be low. However, the occasional occurrence of malformations due to oligohydramnios or to constriction of amniotic bands has been demonstrated beyond doubt.

Pressure atrophy of the skin, asymmetries of the head, marks of compression and impression of various parts of the body can well be attributed to mechanical forces.

Gross mechanical injury rarely leads to malformations in man and other mammals. If the injurious force penetrates the protecting envelopes, abortion is the most probable outcome.

Comment

The conclusions reached as to the causes of congenital malformations are based largely on experiments. Those based on experiments with lower forms do not apply directly to man with his excellent protection of the embryo. However, the development of a malformation in an experimental animal illustrates how a similar condition in man may have arisen.

The value of all experimental work lies in its practical adaptation. Therefore, when etiology is definitely established, prevention of malformations caused by environmental factors may become practical.

Thus, in many areas, endemic cretinism is widely combatted by administration of iodine to the entire population, and to protect developing embryos, the diet of prospective mothers is supplemented with iodine. Measures to prevent malformations caused by prenatal rubella are under discussion. Exposure of girls to the disease during childhood; protection of pregnant women during the early stages of gestation by immune serum; and therapeutic abortion in cases of maternal rubella during the first trimester of gestation; have been advocated. Protection of the gonads of persons in the reproductive age from therapeutic doses of X-ray has been recommended.

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Special reference must be made to the excellent reviews by Peter Gruenwald, Archives of Pathology 44: 398, 1947, and Joseph Warkany, Advances in Pediatrics, volume II, Section I. These articles formed the basis for this review.

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ANAESTHESIOLOGY

Edited by D. G. Revell, M.D., Anaesthetist, Children's Hospital, Winnipeg

Curare in Clinical Medicine

R. Letienne, M.D., St. Boniface Hospital

Presented Feb. 3, 1948, at the Monthly Meeting Winnipeg Anaesthetists' Society

Curare has been known to Occidental civilization for more than 450 years. Until about ten years ago, information about this fabulous arrow-poison has been surrounded by a maze of misconceptions and misrepresentations[1]. Today, although this agent has been accepted in many fields of applied medicine[2], numerous effects ascribable to biologically standardized forms of curare must be thoroughly investigated before we can safely predict their pharmacologic performance in human beings.

History

Following his explorations of the Orinoco valley during the later part of the XVIth Century, Sir Walter Raleigh brought back samples of crude curare to the Court of England. Other South American explorers, like Humboldt (1821), the Schomburgk brothers (1834), showed interest in the plants used by witch doctors in the preparation of curare. In 1896, Boehm suggested a classification of this complex substance based on vehicular sources; information about the true nature of curare remained as obscure as before, because quantitative and qualitative proportions of ingredients always varied, irrespective of native containers.

Despite the fact that crude preparations of curare showed rather unpredictable effects, it was used extensively in experimental work on animals, namely by Claude Bernard, and clinically by French and German investigators in the latter part of the XIXth Century, in the treatment of hydrophobia, tetanus, epilepsy and chorea.

In 1930, Ranyard West decided to reinvestigate curare, seeking an agent which would control the muscular spasms encountered in tetany and in other spastic conditions. Among the many derivatives studied was one isolated by King from an unknown plant source, a pure crystalline quaternary ammonium base which he called tubocurarine[3]. However, isolation of this crystalline substance did not seem to open any immediate, practical horizons in therapeutics at the time.

Thanks to the vision of a modern explorer of South America, Richard C. Gill[4], curare was to reappear in the limelight. During one of his expeditions, Gill was thrown off a horse and became incapacitated, suffering from spastic paralysis. He remembered the effects of arrow-poison used by Indians and postulated that a reliable, unvarying clinical response could be expected from the use of curare should the drug be authenticated botanically and be prepared in constant proportions by modern methods.

The authenticated curare plants brought back by Gill to the United States formed the basis for the studies of McIntyre on a biologically standardized form of curare, and also the source of material from which Wintersteiner and Dutcher prepared their pure, crystalline D-tubo-curarine chloride in 1943, this latter substance being obtained from Chondodendron Tomentosum, and being similar in composition and in effects to the one isolated by King eight years previously[5].

Action

The action of curare has been the subject of sporadic investigation by research workers for more than a hundred years but it is only recently, since the introduction of standardized preparations, that helpful data concerning its effects have been gathered.

Curare acts by interfering with the normal action of acetylocholine at the myoneural or synaptic junction. In other words, it can exhibit a blocking action on nerve impulses where acetylcholine acts as mediator in myoneural transmission.

Exactly where the antagonistic action of curare takes place, at which level, is still debated.

On skeletal muscles all agree that curare, when administered in adequate doses, produces paralysis. Striated muscles are affected in the following order: first, the muscles innervated by the cranial nerves show a loss of tone, then the muscles of the trunk and of the extremities, and finally the muscles of respiration and the diaphragm become involved in the process of paralysis.

It is interesting to note that the affects of curare seem to be potentiated[3] when skeletal muscles show an exaggerated tonicity. Thus, a dose of curare which otherwise would not produce paralysis of any normal muscle may relax a group or groups of hypertonic muscles for varying periods of time.

There seems to be no doubt that curare influences the transmission of impulses in the autonomic nervous system. The site of action may be either at the ganglia or at the effector cells. Its depressant action interferes with conduction of impulses relayed by both sympathetic and parasympathetic fibers, particularly when large doses of the agent are used. For instance,

several authors report that in clinical doses, curare does not affect the heart. This observation may suggest that this lack of effect depends on vagal depression.

Very large doses, whether we can call them clinical or not, have been used in humans. In subjects lightly narcotized, unprotected by splanchnic block, but heavily curarized, visceral traction does not produce the fall in blood-pressure, nor the cardiac disturbances that one would expect during such manipulations. This would suggest that vagal stimulation is inhibited to some extent. Where those techniques of light anaesthesia combined with heavy curarization have been employed it is common to see patients, immediately following operation and having rapidly recovered from anaesthesia and curarization, show signs of neurogenic shock, with pallor, shallow breathing, rapid pulse and collapse of blood-pressure. This form of shock, if treated soon after detection, is easily relieved by the administration of morphine. Those who have used curare in large doses with premedication only, or with light narcosis, describe uneventful anaesthetic courses but make no particular mention of shock as a post-operative sequel, perhaps because it was more or less anticipated, due to the duration or the nature of the operations performed[6, 7, 8]. However, until proof to the contrary is submitted, one must remember that where strong, painful stimuli are elicited, sufficiently deep, protective anaesthesia must be maintained[8, 9], even if curare or similar drugs should mask or temporarily inhibit reactions which would be noted otherwise. Perhaps, also, our notions about the pathogenesis and the treatment of traumatic shock may have to be modified. . . .

The action of curare on the central nervous system has not been too well clarified. On lower animals, like frogs, it seems to influence brain potentials[10]. On man it is reasonable to assume that its direct action is negligible if not totally absent, particularly after reading Scott Smith's account of a most interesting experiment carried out on himself by his associates[11]. He emphasizes the fact that reports about pain or other subjective symptoms as confusion or drowsiness, differ on account of various factors such as pre-anaesthetic medication, liberation of epinephrine from emotional stress, pain modalities varying from one patient to another, or a certain hypnosis developing in the presence of the inability to execute movements.

Without sedation or any anaesthesia Smith was given 500 units of curare intravenously in 33 minutes. Complete respiratory paralysis was noted after about 200 units had been injected, so that the total dose equalled approximately three times the amount required for complete muscular paralysis. Much larger concentrations had previously been used in dogs[12], death always following, wi signs of asphyxia and intestinal haemorrhage. Th Smith displayed such heroic fortitude is worth of commendation!

During the experiment no change was detect in electrocardiographic and encephalograph studies, nor was there any interference noted wi sensory, mental, psychic or mnemonic activiti Controlled respiration was practiced throughou and color, blood-pressure and pulse were not a fected. Subjective and objective evidence of ce tral depression or stimulation were absent.

Commercial curare-drug currently available the market is presented in sterile, aqueous, ac solutions containing the equivalent of 20 biologic units per cubic centimeter. Perhaps a note warning should be sounded as new preparatio having different potencies will soon be dispens and dosage will vary accordingly.

The intravenous and the intramuscular are th most common routes of administration. Curare not effective by mouth, which explains wh natives can relish game-meat without intoxicatio

Clinical dosage (i.e. single dose) varies from to 100 units for the average adult, depending effects desired. By intravenous injection relax tion sets in within 60 seconds and lasts for 20 30 minutes.

The drug is rapidly destroyed by the liver excreted by the kidneys. Electromyograph studies, however, show that a residual curare-li action is present for some hours following inje tion so that fully effective doses may ha additive effects if repeated at close intervals. enough time elapses between repeated administr tions, similar doses will produce identical effect with no change in sensitivity or tolerance. Th vigilant anaesthetist must remember, therefo that muscular weakness may persist for hour that atelectasis will occur if the patient does n rapidly recover full activity of his diaphragma and intercostal muscles. After-care is of utmo importance[13], because it is one of the anaesthetis prime duties to dispense this care, as much as th pre-operative evaluation of a patient's conditio or the mere technical administration of anae thetics.

Besides blocking synaptic transmission at di ferent levels, investigators have shown that cura causes a slight decrease in liver function, th blood sugar may be upped[13]. Little effect is not on the stomach but there may be temporary lo of tone and of peristaltic activity of the intestine Curare also exhibits histamine-like actions[15, 16, producing a characteristic wheal following int cutaneous injection, hypotension and bronch spasm. This last feature, always a severe co plication when encountered during general anae thesia, has been effectively prevented by the pr

operative administration of anti-histamine drugs. When bronchospasm is a truly histamine-like reaction, the ordinary antidotes of curare, like prostigmine, ephedrine, or atropine, are quite useless.

Uses

In 1939, Bennett, of Omaha, Neb., was the first one to use curare as we know it, to minimize or prevent traumatic complications in shock therapy[18]. Several investigators have now used the drug with success. In the case of metrazol-therapy, dosage to induce convulsions may have to be raised but therapeutic effects are unaffected. From 20 to 50 units are given a few minutes before treatment.

Following earlier observations made with various forms of crude curare, the purified extract has been used for the relief of several neurological conditions where excessive spasticity and rigidity are present[19].

Whether it be in paralysis agitans, in Huntington's chorea, in athetosis, there will be a temporary regression of rigidity and tremor under the influence of curare. More information must be tabled before the benefit of oil preparations can be ascertained.

In Little's palsy, like in all forms of spastic paralysis, minimal doses of curare, sufficient only to cause ptosis of the eyelids, will bring about a transient relief from hypertonicity. However, if the drug is continued for long periods at regular intervals, passive and active mobilization are supposed to be greatly facilitated and physiotherapy rendered much more effective.

The case of poliomyelitis is more difficult to gauge in respect to curare[20]. It is advocated by some during the acute stage of the disease, essentially to prevent spasm, to abolish contractures and to facilitate breathing and swallowing. This practice is condemned by many because latent respiratory forms of the disease are not uncommon and the use of such a drug as curare only increase an already serious and imminent danger. Then, it is claimed, if poliomyelitis causes deterioration of anterior horn cells in the spinal cord along with a deterioration of a number of motor end-plates in skeletal muscles, the elective "lissive" action of the drug may still be questionable, as it is not proven that curare, at least D-tubocurarine chloride, does not act exclusively by a paralyzing effect. West proposed this view in 1935 [3] and other investigators, mainly McIntyre, have not modified this impression.

Hiccough, a convulsive diaphragmatic contracture, seems to respond well to curare. In other conditions producing generalized convulsive contractures, like in strychnine poisoning, eclampsia or status epilepticus, this agent is helpful by decreasing fatigue and metabolic requirements, although, of course, purely symptomatic.

Curare has been tried in certain cases of dysmenorrhea where sacral para-sympathetic overactivity is held responsible for rigidity of the cervix. The approach is logical but not conclusive, as yet.

Curare has been used for the control of convulsions in tetanus. Obviously, this purely symptomatic treatment must be undertaken for long periods and acts merely as an adjuvant while attempts are made to keep the patient alive. How to treat the disease is still somewhat a matter of conjecture, particularly in the face of toxic modalities of tetanus, but judicious use of barbiturates and curare may prevent an abuse of other too toxic drugs.

Three patients were treated for tetanus last year in this hospital, with curare and avertin. Two of them died within a week after admission, while the third recovered completely and was discharged after 25 days of hospitalization. In all three, large doses of both drugs were used, permitting control of convulsions. The patients became conscious about four to six times daily during which periods they were encouraged to do some deep breathing exercises, were helped to change position or were fed by mouth whenever possible. If, for some reason, protracted unconsciousness supervenes, lasting more than six hours, anticonvulsive therapy should be withheld.

Following the studies of Grace Briscoe, curare has been used as a diagnostic test in myasthenia gravis. One twentieth of the physiologic dose will bring about an aggravation of this condition. The test should not be undertaken unless prostigmine is available.

It is well known, since its introduction by Griffith, of Montreal, that curare has been used extensively in anaesthetic practice to bring about muscular relaxation under light narcosis. It can be used with any agent, but in smaller amount if in conjunction with ether, avertin or a barbituric-acid derivative. Some use it to prolong or to reinforce spinal block. Here again the question arises as to whether curare should ever be used in operative procedures where spinal analgesia or other regional blocks prove to be inadequate, unless some form of general anaesthesia is employed, because curare by itself is only a relaxant and not an analgesic.

No doubt, curare is an extremely important addition to the armamentarium of the anaesthetist, but, like the atom-bomb, it has not solved all his peaceful endeavours. "Reactionary" happenings ever disturb his aims, and curare is not a panacea capable of masking poor or bad anaesthesia.

Myasthenia Gravis is a definite contraindication to the use of curare in anaesthesia. Impaired renal function may lead to a risky prolongation of its action. Since bloody diarrhea was present follow-

ing the administration of large doses to animals[12], it may be wise to use it carefully in disease of the intestinal tract.

It has been used when shock was present; deep anaesthesia must be avoided as prolonged relaxation may subsequently result in hemoconcentration, which eventually leads us back to shock again. Following too deep anaesthesia we may also have to deal with an increase in pulmonary complications or circulatory failures.

Histamine-like reactions with marked spasm are fortunately rare but demand urgent and proper management. Complete relaxation of the larynx is the general rule of curare effect, and for this reason constant attention must be given to prevent accidents occurring from regurgitation or from impaction of the glottis.

Great strides have been made since the natives of British Guiana concocted their Calabash curare and traded it with curious Europeans. The modern product's safety and non-toxicity may account for its rejuvenated popularity. Another equally important reason is that the exact pharmacology of curare is gradually understood more thorough better antidotes are at our disposal and, not lea knowledge and practice of controlled or artifici respiration are better known.

Without the ability to assume immediate co trol of obstructed or failing respiration, witho oxygen or specific antidotes readily available, t clinical use of curare remains a potentially dange ous therapeutic aid, while in proper hands it w serve reputably among the major drugs whi slowly enrich our pharmacopeia.

(For references, see page 209)

Before departing at the end of March, to ma my future home at the West Coast, I would like take this opportunity to say au revoir to my ma many friends in the Manitoba Medical Associati It was a pleasure during the last seven months have attempted to bring you new and time articles and abstracts on anaesthesia. I would al like to thank members of the Winnipeg Society Anaesthetists who co-operated in presenting ori nal papers.

D. R.

Third Annual Meeting
Canadian Anesthetists Society
(Western Division)
Regina, Sask. - April 23, 24.

The Western Divisions of the Canadian Anesthetists' Society are meeting jointly with delegates from the American Society of Anesthetists at Regina on the above dates. This is the Third Annual Meeting of the Western Divisions, t first having been held in Winnipeg in 1946. A excellent program has been arranged by Drs. B. Leech and A. C. Rumball, of Regina.

The mornings of the two days will be taken with clinical sessions and discussions.

If our two previous meetings may be taken indicating the growing interest in modern anesth siology this year's get-together will be well wor attending.

D. G.

April 23rd

Morning:

Clinical Sessions and Discussions
at the Regina Grey Nuns' Hospital.

Luncheon:

A joint luncheon with the Men's and Women's Canadian Clubs at the Hotel Saskatchewan. Guest speaker, Dr. Ralph Waters, of Madison, Wisconsin.

Afternoon:

Rectal Sodium Pentothal Anesthesia in Children.
Dr. E. H. Watts, Edmonton.

Problem of Dead Space in Closed Circuit Anesthesia in Small Patients.
Dr. Dan. Revell, Winnipeg.

Pentothal Sodium Anesthesia.
Dr. Chas. Adams, Rochester, Minn.

Statistical Methods in Preparation of an Annual Report on Anesthesia in a General Hospital.
Dr. M. W. Bowering, Regina.

Dinner:

Cocktails and Dinner at Hotel Saskatchewan.
Followed by:

Anesthetist-Surgeon Relationship in Caesarean Section.
Dr. J. Brown, Regina.
Drs. Chas. Adams and R. A. Gordon will also speak.

April 24th

Morning:

Clinical Sessions and Discussions
at Regina General Hospital.

Luncheon:

Guest Speakers: Mr. J. Hunt, Executive Secreta of the American Society of Anesthetists and D R. A. Gordon, Secretary of the Canadian Anesth tists' Society.

Afternoon:

New Jugs and Old Wine, followed by
The Anesthetist and Oxygen Therapy,
Dr. Ralph Waters, Madison, Wisconsin.

Diagnostic and Therapeutic Nerve Block,
Dr. R. A. Gordon.

Buffet Dinner:

Winthrop-Stearns Inc. are hosts to cocktails befo a buffet dinner at which the Anesthetists will guests of the Saskatchewan Section of the Canadi Anesthetists' Society.

Ladies' Program:

A Ladies' Program is being arranged.

Hotel Reservations:

Hotel reservations should be made directly with t Hotel Saskatchewan.

Hospital Clinical Reports

Reported by J. M. Whiteford, M.D.

St. Boniface Hospital

Reported by F. G. Stuart, M.D.

Clinico-Pathological Conference

St. Boniface Hospital
February 1, 1948

Case Study

Mr. A. C. S. S.B.H. No. 47-14,002. Age 40. Paint shop foreman. Anglo-Saxon.

Entrance Complaints

1. Recurrent colds, 9 months.
2. Tired, run down feeling, 9 months.
3. Paroxysms of coughing 2½ months.

History of Present Illness

This patient felt quite well until New Year's Eve, 1947, when he was stricken with the first of four "colds," from which he was to suffer during the ensuing nine months.

This was featured by a barking productive cough, fever and chills. After two days at home he returned to work feeling "like the wrath of God." A dry, hacking unproductive cough followed this illness and persisted until he contracted the second cold at the end of March, 1947. Again there was considerable coughing. In addition he had a sharp stabbing pain in the right side of the chest. The doctor who attended him at this time assured him that "it was muscular." About this time the patient noted that he was quite tired after his day's work and had no ambition to do anything in the evening.

From April to mid-August his only complaint was an occasional "smoker's cough."

The third cold developed in mid-August when he was on a rather strenuous vacation train trip. A severe harassing paroxysmal cough with very little expectoration was the main complaint. Smoking aggravated it. The hot weather at this time made him feel "absolutely played out." His friends were now remarking that he did not look well. His wife describes him "coughing in his sleep" and spraying considerable sputum about. This caused her to become rather alarmed about his condition and she insisted upon his seeing a doctor. In contrast to her anxiety he did not exhibit any noticeable concern about his health. In fact, it was the impression of the doctors whom he consulted at this time that he tended to minimize his symptoms.

Physical examination at this juncture revealed no unusual signs. Nevertheless, because of the nine months duration of his complaints it was strongly suspected that there was some underlying chronic respiratory pathology present. This suspicion was further strengthened by the finding of an elevated sedimentation rate, namely: 31 mm. per hour.

Inquiry into his past revealed that he had suffered from "bronchitis" in 1931 and 1943. Previous chest films in 1944 on discharge from the R.C.A.F. and in January, 1946, during a plant tuberculosis survey were negative.

On direct questioning he admitted no loss of weight or hemoptysis. The evidence now at hand pointed to three possible diagnoses:

1. Tuberculosis.
2. Chronic sepsis with acute superimposed episodes (pneumonitis).
3. Bronchogenic carcinoma.

With a view towards the acquisition of additional evidence on which to base a differentiation a single P.A. film of the chest was obtained. This revealed an opacity of moderate homogeneous density and vague outline in the medial half of the right central lung field. This overlapped the right hilar shadow to some extent. The position and appearance of this lesion did not seem to be consistent with tuberculous pathology, so the latter was excluded. Partial atelectasis of the right middle lobe and pneumonitis remained to be differentiated. The history of recurrent acute inflammatory "flare-ups or "colds" seemed to favor the latter. For this reason a working diagnosis of residual pneumonitis was made. As this was based on circumstantial rather than direct evidence it was felt that further proof was required. An uneasy feeling that the lesion might be atelectasis associated with bronchogenic carcinoma lurked in the background. The patient was therefore advised to go home and rest for a month, after which he was to return for another x-ray examination and review. The rationale behind this course of action was the expectation that if the lesion were inflammatory it would resolve in a month, whereas if it were atelectasis due to a bronchogenic carcinoma it would not show any diminution.

It was during this period of rest and observation that the fourth cold came upon him. This occurred at about the end of the third week of rest. It began with a severe chill lasting about ten minutes, which was followed by a fever and severe diaphoresis. After another week in bed he returned to his doctor as previously arranged for a review.

Physical examination revealed nothing of definite significance. His sedimentation rate was now up to 60 mm. per hour. A P.A. film of the chest revealed some evidence of increase in the extent of the above mentioned opacity. On a right lateral

film made at the same time the opacity was seen to coincide with the region normally occupied by the right middle lobe. It had the appearance of a partially shrunken right middle lobe. This was considered evidence of partial atelectasis of this lobe. A bronchogenic carcinoma obstructing the right middle lobe bronchus was suspected of being the cause. Pneumonitis was therefore excluded.

He was immediately admitted to hospital. The temperature, pulse and respiratory rate were normal. Blood studies were also normal. Physical examination revealed some bronchial breathing anteriorly over the lower portion of the right hemithorax. On October 17, 1947, a bronchoscopic examination was done. The right middle lobe bronchus was found obstructed by a new growth. A specimen was removed for microscopic study. This revealed hyperchromatic anaplastic cells which were considered evidence of a bronchogenic carcinoma. On October 24th, 1947, a right pneumonectomy was done. A bronchogenic carcinoma was found in the right middle lobe bronchus. There was no apparent lymphatic node involvement. The post-operative course was uneventful and the patient was discharged three weeks after operation, on the 23rd of November, 1947. He returned to his work on the 2nd of January 1948.

Discussion

In retrospect, the fact that a month passed from the time he came to medical attention in September, until the diagnosis was made was discussed. As previously indicated the history seemed more consistent with an acute pulmonary inflammatory lesion (pneumonitis). Therefore, bronchoscopy was no more indicated initially than in any other acute pulmonary inflammation. The indications for bronchoscopy in the detection of bronchogenic carcinoma were said to be:

(a) When the x-ray is negative: Hemoptysis; Mucoid sputum; Unexplained cough.

(b) When an opacity is seen on x-ray; Non resolution of a suspected inflammatory lesion in a month.

The accuracy of bronchoscopic examination was commented on. At least 75% of bronchogenic carcinoma occurs in portions of the bronchial tree within the range of bronchoscopic visibility. In the remaining 25% indirect evidence may often be obtained from the examination of stained smears of bronchial secretion, obtained via the bronchoscope. These often show characteristic malignant cells.

Contrary to early expectations, smears of oral sputum are not as reliable for the detection of tumor cells as those made from the secretion obtained by bronchoscope. This is unfortunate as it would be very satisfactory and simple to make the diagnosis from oral smears had this meth proven successful.

There was some inquiry regarding the relatio ship of this man's occupation as a painter for years and the development of bronchogenic ca cinoma. Irritation of the respiratory passages w stated to be a recognized factor in the develop of bronchogenic carcinoma. The common squamo cell types generally occur in heavy smokers. A autopsy ratio of 6 males to 1 female for bronch genic carcinoma supports this relationship becau men are generally heavier smokers, and mo prone to be exposed to irritating fumes. Mode technics of paint spraying are considered a sour of respiratory irritation if protective masks a not worn.

Obliteration of the thoracic space after pne monectomy was described. A serous fluid whi may contain some blood fills the vacated spa initially. Then the mediastinum gradually shift and the ribs fall inwards. The diaphragm in ge erally paralyzed by phrenic crush and becom elevated. Finally fibrosis replaces the fluid. Du ing this period of adjustment, the air pressure the cavity is controlled so that there is a slig negative pressure. This is not allowed to becom excessive because it produces a painful "pulli sensation."

Although there was no apparent gross lymp node involvement the prognosis in this case w guarded because of the very anaplastic nature the cells.

Deer Lodge Hospital

Reported by P. T. Green, M.D.

Clinico-Pathological Conference No. 27

Born 1902. Enlisted with 19 Field Batter R.C.A., Sept. 6, 1939 (3rd Field Regiment) a proceeded overseas with unit on Dec. 10, 193 Remained with unit until May, 1943, then serve with No. 1 C.A.R.U. thereafter. Employed f about 3 years in Q.M. Stores and acted as assista storeman. S.O.S. Cdn. Army Overseas on May 1 1944, and discharged in July, 1944.

Began to have dizzy spells in August, 1941, a shortness of breath on exertion. Seen by medic consultant in 1942 and found to have hypertensio BP 220/160. Returned to Canada in 1944.

Admitted to Deer Lodge Hospital on July 1944, for investigation.

History of shortness of breath on route marche for 3 years. Had spells of blackout about 7 time in the past three years. The last was in June, 194 He would go unconscious (bystanders stated was very white during attack). No heart pai Frequent frontal headache. Nocturia 2X.

PX—BP 240/155—Arteries firm—not brittle.

Heart—Reduplication of first sound at apex, no murmurs, no irregularity. Slight enlargement judging by limit of impulse but it is not excessive.

Lungs—clear. Abdomen—neg. Fundi—Minimal arteriosclerosis.

Aug. 25, 1944, E.C.G.—"Chronic left ventricular strain. Lab—Mosenthal—S.G. 1.012-1.027. Night S.G. 1.012. Albumin—present. Micro: Neg. Hgb 96%; RBC 4,710,000; B.S.R. 9 mm.

Given pension for hypertension 100%; discharged from Deer Lodge Hospital Dec. 19, 1944.

Admitted to Deer Lodge Hospital on March 3, 1945.

Complaint: "Vise like" pain in chest, dyspnoeic. Px—Obviously dyspnoeic, lips somewhat cyanotic. Heart—Enlarged 2 fingers beyond nipple line—sharp snapping aortic sound and 2nd pulmonic sound accentuated. BP 242/160. Chest—Few scattered rales—both bases. Extremities: Ankles show pitting edema.

March 3, 1945—X-ray of chest—"Heart and great vessels normal. Both diaphragms are indistinct. Roots heavy. Rather well marked infiltrative changes seen in right base, slight on left, suggesting a septic process."

March 5, 1945—E.C.G.—"Chronic left ventricular strain."

March 6, 1945—Headache, shortness of breath, swelling of ankles, poor vision for reading, cough, piles.

HPI—Headache—has had these for 3 years off and on. Pain originates in frontal region bilaterally and "seems to split head open." It is a headache, comes on anytime of the day. Has taken 6-8 Frosst 217 for relief of pain. This never abolished the pain completely.

2. Shortness of breath. Was using 5 pillows at home due to this symptom. Found relief from this but as soon as he coughed—he could never get settled down to sleeping. Thinks this symptom is disappearing since admittance.

3. Swelling of ankles—Both ankles have swollen up since admittance. Patient says he had past injury to right ankle and it used to swell. Ankles pit easily.

4. Eyes poor—Noticed this overseas. Has good vision for distance but cannot read for any length of time because of blurring and headache.

5. Hemorrhoids. Has 3 primary hemorrhoids. Never noticed them until 4 a.m. on March 3, 1945, when they protruded while forcing himself to defecate. Were replaced but redescended with cough. Are very irritable.

Functional

Respiratory: No pain. Non productive cough. G.I.—Appetite fair. No B.M. for 5 days. G.U.—Frequency—nocturia 10X. No pain.

March 7, 1945—2 a.m. Patient has been complaining of some precordial pain all evening—relieved by stomach powder and belching. 7.30 p.m. BP 210/150. Now pain is more severe—is steady, diffuse over precordium and sternum and radiating to neck and down left arm. BP 190/145. Pulse is rapid and weak. Heart sounds muffled. Patient confused and sweating profusely. E.C.G.—No change since March 5, 1945. Interpretation: Chronic left ventricular strain. Patient more comfortable this a.m. Has increase in edema however.

March 12, 1945—Referred to surgery re hemorrhoids. Surgery not advised as hemorrhoids part of general picture of cardiac incompetence.

March 13, 1945—Feeling much better today. Had good result from I.V. salyrgan. BP 190/122. Heart is irregular apparently from auricular fibrillation—numerous extra systoles noted.

March 20, 1945 — Complaints — very short of breath. Swelling and soreness in the legs. Examination: Dyspnoea is quite marked, the pulse has a galloping rhythm, marked pericardial rub, and there is a systolic murmur at the apex. There are passive congestive rales at the base of each lung. The liver is tender and is slightly enlarged with marked edema of both legs. The edema is quite soft and is secondary to heart failure.

April 2, 1945—Very miserable today. Very tender spot at inner side right wrist. Has had paleness of the finger. Radial artery below the painful area pulsates well but the superficial volar artery may be occluded. BP 190/130. Heart irregular but sounds a little better. Chest—passive congestion. Generalized oedema.

April 12, 1945—Patient continued to retrogress. Expired at 3.30 a.m.

Laboratory

March 3, 1945—Urinalysis—Acid, 1,020, Alb. Marked; Micro: occ pus cell. Hgb 82%; RBC 4,130,000; WBC 13,800; BSR 40 mm.

March 5, 1945—WR—negative. Urinalysis—Acid, 1.015, Alb. Marked; Micro: Few pus, B.U.N. 26.2mg%.

March 6, 1945—Blood creatinine 3.2 mg%.

March 7, 1945—Urinalysis: Alkaline, 1.012, Alb. Marked; Micro: mucus, shreds, occ pus cell.

March 10, 1945—BSR 105 mm.

March 15, 1945—Plasma proteins: Alb. 2.2; Glob 2.2; Fibrinogen 0.52; Total Proteins 4.9.

April 2, 1945—BSR 101 mm.

Temperature on March 4, 5, and 6, 99° and on March 7th, 100°; March 8, 9 and 10, 99°, and then chiefly normal and over 99° on 2 occasions, April 5th and 6th.

Comment

We have then a man of 43 years, discharged from the Army for hypertension. Significant points are—July 6—admission—he complained of

nocturia 2X, headache and blackout. Physical findings showed B.P. 240/155, an E. C. G. with Left Ventricular Strain and Albuminuria S.G. 1027. Blood counts and Sed. Rate were normal.

March, 1945

Edema and enlarged heart, slight lung sepsis. Sed. Rate 40 mm. W.B.C. 13,800 B.U.N. 26.2 mgm. B1. creatinine—3.2 mgm.; symptoms of headache, loss of vision and visual change, nocturia 10X.

Apparently this case of essential hypertension has now progressed to renal failure with early elevation of B.U.N. and Cardiac decompensation. Up to this point, the picture is quite clear. However, on March 7, 1945, there is a sudden attack of "pre-cordial" pain. There is a temp. elevation from March 4th to March 10th, and a B.S.R. of 105 mm. Blood proteins are low with albumin 2.2 only and Globulin 2.2 also. The E. C. G. shows no change and there is still albuminuria but no R.B.C. in urine. On March 13, nearly one week later, we have a gallop rhythm, pericardial rub and first mention of liver enlargement with tenderness. There is obvious cardiac failure. Unfortunately, there is no record of urinary output or fluid intake nor of any distension of neck veins. There are no further B.U.N. determinations and the B.S.R. remains at 101 mm. On April 2, there is a thrombotic episode in the wrist and he died on April 12th.

The general course is therefore one of essential hypertension with renal involvement. The high S.G. of the urine and lack of R.B.C. tends to rule out the possibility of glomerulonephritis. Also this man has had hypertension for at least 3 years. His terminal admission is one of combined cardiac and mild renal failure. How much of the edema may be due to the blood protein picture is open to question. X-rays have reported normal heart and blood vessels but as we see them now, there is certainly evidence of cardiac enlargement of Left Ventricular type. The episode on March 7th was obviously considered a coronary infarct but the evidence of a pericardial rub, 6 days later and sudden failure as evidenced by sudden distension of the liver and an unchanged E.C.G. suggests the possibility of a Pericarditis. The high B.S.R. and temperature, **preceding** the episode, support this picture. This condition is not infrequently a terminal picture in uremia but we have only one B.U.N. estimation which is not high enough to warrant this diagnosis.

Infection may then be a cause of this condition which again is not unusual. It is disappointing that we do not know about neck veins and also that there were no typical E.C.G. changes suggestive of pericarditis. Death was due to a congestive failure and pulmonary edema.

Diagnosis

Essential Hypertension with Renal Failure.

Infectious Pericarditis and terminal congestive failure.

Second Choice

Hypertension—Coronary thrombosis.

Autopsy Findings

The heart is greatly enlarged to 780 gram (twice normal). The pericardial cavity is obliterated by adhesions of recent origin. There is hemorrhagic discoloration but no pus formation. The visceral pericardium is thickened and haemorrhagic. The right ventricle wall is hypertrophied to twice normal thickness and the left ventricle wall is 26 mm. thick (normal 11). There is no endocarditis or valvular disease. The aorta shows atherosclerosis. The coronary arteries are patent.

Microscopic Findings

Heart:

Section shows parenchymatous degeneration and edema of the muscle fibres. There is also older degeneration and fibrous tissue replacement of fibres. In places there are small areas of lymphocytic infiltration. Vessel walls show arteriosclerosis and narrowed lumen.

Pericardium:

The pericardium is thickened by a deep layer of recent granulation tissue with many vascular channels and some outgrowing granulations. The surface layer is a cellular exudate and in this are seen bacteria which are staphylococci.

Left Lung:

Section shows atelectasis and some edema. The bronchioles are filled with mucus and desquamated epithelial cells.

Right Lung:

As above. Bronchitis marked. Many brown pigmented histiocytes "Heart failure cells."

Liver:

Section shows fatty degeneration and extreme congestion.

Conclusion

Pericarditis—staphylococcal.
Cardiovascular arteriosclerosis.
Nephrosclerosis.
Atelectasis and bronchitis of lungs.
Pleural effusion.

Pericarditis

Definition:

Pericarditis is an inflammatory process involving the pericardium.

Incidence:

Paul White says pericarditis is found in about 5% of post mortem examinations and is present as an acute condition in ½ to ⅔ of these cases. Age

Majority of cases between 10 and 40 and males 3:1. In 362 autopsies in this hospital pericarditis was found in 33 cases or 9.1% of autopsies and in majority of cases was unsuspected antemortem.

Etiology:

The etiology is extremely varied and it is probably never a primary disease. Commonest causes are (1) Rheumatic fever—may occur at any stage of rheumatic fever but most commonly during an acute exacerbation and in the more rapidly progressing forms of rheumatic heart disease. This is probably the most common. (2) Pneumonia—Chiefly pneumococcal type and especially in empyema. Spreads from lungs—also by lymphatics. (3) Tuberculosis by lymphatic spread, probably—mediastinal and tracheo-bronchial lymph nodes or by miliary spread. (4) Chronic nephritis with uremia—pericarditis uremica is probably of chemical origin. (5) Coronary occlusion with infarction—pericarditis epistenocardia. (6) Perforating wounds of the thorax.

Pericarditis also occasionally complicates scarlet fever, acute tonsillitis, septicemia (from puerperal infection, osteomyelitis, furunculosis and gonorrhea) Meningococcic meningitis, actinomycosis, malignant tumors, tularemia, undulant fever, primary atypical pneumonia, disseminated lupus erythematosus, rheumatoid arthritis, influenza, typhoid fever.

Lewis says, "Pericarditis is not infrequently caused by a direct spread of infection from neighboring suppuration—for example, from empyema or ulcered oesophagus—or by pus tracking through the diaphragm from appendix, stomach, or gall bladder."

Organisms found in exudate are commonly pneumonoccus, tubercle bacillus, pyogenic organisms especially streptococcus, but not streptococcus viridans, gonococcus, colon bacillus and influenza bacillus, staphylococcus.

One can find **almost** any organism and virus as the cause of pericarditis.

Acute Fibrinous Pericarditis

Acute fibrinous pericarditis may develop in the course of other diseases, as rheumatic fever, in which it is very frequent, pneumonia, chronic Bright's disease, often without in any way influencing the clinical picture of these diseases.

The pericardium shows the usual characteristics of inflammation of a serous membrane.

When seen at its earliest stage acute fibrinous pericarditis may be localized but it soon involves the whole sac—visceral and parietal pericardium. The surface loses its gloss and a thin film of sticky fibrin, arranged in irregular bands and of light yellow color is seen. This is sometimes called "bread and butter" pericardium. Increase in the amount of fibrin produces the "shaggy heart" or "cor villosum." As the fibrin is separated from the exudate, the movements of the heart whip it into thin, gray villi and heavier bands, which occasionally are arranged spirally about the heart, the heavier bands being near the base. Microscopically hyperemia of the pericardium is seen with a moderate infiltration of leukocytes, lymphocytes and other cells of acute inflammation in the interstitial tissues, and even in superficial parts of the subpericardial fat. The endothelium has disappeared or remains as a few swollen, degenerate cells. On the surface is a mass of fibrin in heavy bands and fine reticular mesh, enclosing leukocytes, lymphocytes and other migrating cells, and occasionally also bacteria. This is the dry or plastic pericarditis of the clinicians. It is soon accompanied by an increasing amount of fluid exudate. The fluid is a cloudy limpid fluid of relatively high specific gravity, contains cells of the exudate and tends to clot upon aspiration.

In rheumatic fever any rheumatic lesions are apt to be hidden by the acute inflammatory reaction but an occasional Aschoff body may be found in the subendothelial tissue and have the same microscopic features as those seen in the myocardium in rheumatic fever. As the lesion progresses, the fibrinous exudate tends to undergo organization from both the parietal and visceral surfaces, organized by the invasion of new vessels and fibroblasts. This will form adhesions and, if the patient survives the acute stage of the disease, the end result may be the obliteration of all or a considerable part of the pericardial cavity. This produces a gradually increased strain on the heart with a very marked work hypertrophy. The inflammatory cells are mostly lymphocytes and plasma cells with only an occasional polymorphonuclear leucocyte. The inflammation extends through the sub-pericardial fat down to the heart muscle.

The after-effects vary. There may be merely one or two opaque white patches of thickened epicardium known as milk spots. If absorption of the exudate is less complete there may be numerous adhesions. Finally there may be a completely adherent pericardium. Calcification of the lesions may occur, so that stony plates are formed on the surface of the heart.

The fibrinous type of pericarditis occurs sometimes in uremia, it is a chemical inflammation because so far it has not been found to be due to infection.

There is often localized non bacterial acute fibrinous pericarditis over myocardial infarcts.

The exudate of acute pericarditis may be hemorrhagic in tuberculous pericarditis, in that due to hemolytic bacteria, in the irritation of the pericardium due to invasion of malignant tumors, and

when pericarditis occurs in hemorrhagic diseases such as scurvy, purpura or hemophilia.

Purulent Pericarditis

If the pericarditis be the result of pyemia, or other infection with pyogenic organisms, extension from neighboring suppurations or wounds, the process rapidly becomes purulent. There may be little fibrin present at any period of a purulent pericarditis, and if present early may be subsequently reduced by the lytic action of cellular and bacterial enzymes. The pus may be thin and limpid or thick and viscid, depending upon the amount of exuded fluid. Microscopically, the appearance of the pericardium is much the same as in fibrinous pericarditis, except for the smaller amount of fibrin and the large number of leucocytes and pus cells. Infection by gas forming organisms may lead to pneumopericardium in addition to the suppurative process.

Tuberculosis

Tubercles may be found in the pericardium as a part of disseminated miliary tuberculosis; there is often little or no inflammation of the membrane. In contrast, tuberculous pericarditis shows marked inflammation, which may be acute or chronic. It is usually the result of extension from lungs, pleura, mediastinal lymph nodes or bones. An acute fibrinous pericarditis may occur, but more commonly the process is chronic with increased connective tissue, often adherent, with remnants of fibrin and with fairly extensive caseation. Tubercles may be evident grossly or may require microscopic demonstration. Sometimes there is a large amount of serous exudate which may be blood tinged, or even distinctly hemorrhagic. Fibrin may be rich in amount and there may be slight hemorrhage. Rarely the exudate is purulent. Tubercle bacilli are rarely demonstrated in the exudate by staining, but the material produces tuberculosis upon injection into guinea pigs.

Boyd says: The heart is usually covered with a fibrinous exudate which completely conceals the tubercles. The effusion is usually very abundant and purulent. If a pericardial sac is distended with pus, the condition is likely to be tuberculous or pneumococcal. Hemorrhage is common. A bloody exudate should suggest either tuberculosis or malignant disease. Microscopically the characteristic tubercles are seen under the fibrinous exudate.

Chronic Pericarditis

The outcome of an acute pericarditis may be either chronic pericarditis or cicatrization. Chronic pericarditis may be localized or widespread. A rare form of chronic pericarditis is the nodular variety, in which tiny nodules a millimeter or so in diameter, opaque, and covered by endothelium, are distributed in the epicardium especially alo the coronary sulci. Extremely common are t so-called milk plaques or solder spots. Rare early life, they are more frequently found as a advances. The epicardium, especially over t anterior surface of the myocardium, shows a area of fibrous thickening and opacity with smooth surface, fairly well defined from the su rounding epicardium. The plaques may be multip and widely distributed. They vary from a fe millimetres to several centimetres in diameter, b do not exceed this in thickness. Usually the hea shows other chronic disease; e.g. in the valve Some plaques appear to be chronic inflammato tissue and others merely scars, but in any eve they are probably the outcome of a precedi inflammatory process.

Chronic Constrictive Pericarditis

In this uncommon condition the heart is com pressed by a layer of dense tough fibrinous tiss which envelopes the organ. There is great u certainty as to the cause of the dense envelop Rheumatism can be ruled out. In healed rheumat pericarditis the scar tissue is thin, the fibres a slender, chronic inflammatory cells are prese and there is no extensive destruction of tissue. constrictive pericarditis the thick, dense envelo may present large cavities containing inspissate caseous material. The tissue is hyalinized, a collagen fibres are huge, calcification is comm and tissue destruction marked. It seems probabl that most cases are tuberculous, although comple healing may have occurred.

The compression prevents the normal diasto filling of the auricles, so there is marked diste sion of the jugular veins, marked enlargement the liver and recurring ascites. The heart, althoug profoundly disabled, is characteristically small a quiet, because it is unable to dilate or hypertroph The liver and spleen may be coated with a lay at first fibrinous and later fibrous, the so-call sugar icing (Zuckergress). This is apparently d to long standing ascites. The pleura may similarly involved. This polyserositis has be called Pick's disease. Resection of the thicken and constricting pericardium has given excelle result in many cases.

Symptoms

There are often no symptoms referable to t pericarditis itself, so that it is either overlooke detected incidentally or perhaps not discover until extensive effusion has appeared. Even symptoms are present, they are likely to be co fused with those of a pneumonia or overshadow by a terminal infection.

Often the pericarditis is discovered for the fi time at autopsy.

Paul White and McGuire say acute pericardial disease is usually painless but Smith in Musser's Internal Medicine says pain is an outstanding symptom especially in the rheumatic type.

Pain usually occurs when the pleural or outer border of the diaphragm is involved, frequently with complicating pleurisy and is sharp, intermittent or continuous, aggravated by or sometimes felt only during inspiration, coughing or change of position and referred to the precordium, neck, left shoulder and arm as in angina pectoris and coronary occlusion and to the abdomen simulating an acute abdomen.

The other important cause of symptoms is distension of pericardium by fluid, by air or fluid and air. The pressure symptoms are of two sorts: (1) Those due to compression of the heart whereby insufficient blood enters the heart, the lungs and systemic arteries, with resulting dyspnea, weakness, faintness, venous congestion, and epigastric and right upper quadrant discomfort from hepatic engorgement. (2) Those due to compression of lungs, trachea, bronchi, esophagus, and great vessels, with further dyspnea or orthopnea, irritative cough, hoarseness and dysphagia. Distressing dyspnea and thoracic oppression are common symptoms of a large pericardial effusion and the patient often assumes a characteristic attitude of distress, sitting upright and leaning forward.

Signs

1. Pericardial friction rub—may be absent or escape notice, may be transient or may be persistent. If heard it frequently persists even in the presence of an effusion especially in the prone position.

2. Effusion—An amount of less than 150 cc. is probably not discoverable by any method of examination since it produces no definite signs. Effusions of less than 300 cc. are usually missed clinically.

Increased cardiac dullness when enough fluid is present.

An early sign of the cardiac tamponade or acute contrictive pericarditis due to pericardial effusion is enlargement of the liver with tenderness on pressure. Slightly displaced downwards, the liver is engorged, due to compression of the right auricle, great veins and especially the mouths of the hepatic veins which open into the inferior vena cava caused by the resting of fluid in the pericardial sac on the diaphragm at the point where the inferior vena cava comes through. This may go on to ascites with or without edema of legs. Extensive effusions may have general edema, cyanosis of skin and mucous membranes.

A massive effusion may have a fall in Blood Pressure and paradoxical pulse may appear. There will be elevated venous pressure—20-30 cms. of water. Tachycardia is usual.

3. Fever and leucocytosis may or may not be present depending on the primary cause of the disease.

Diagnostic Aids

1. X-ray—should give diagnosis.
2. E.C.G.—Hard to differentiate from coronary occlusion.
3. Aspiration of fluid or pus—necessary for diagnosis of organism.

Treatment

1. Sedation and ice bag to praecordium.
2. Treatment of primary disease.
3. Antibiotics into pericardial sac have been used with success.
4. Paracentesis of pericardium in tamponade and repeated as necessary.
5. Surgery in purulent pericarditis, but this has been replaced by antiobiotics where the organism is sensitive.
6. Surgery in chronic constrictive pericarditis frequently produces dramatic improvement.

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Medico-Historical

J. C. Hossack, M.D.

The Skin of Mesra

(The recent war was not an unmixed evil. To be sure in ancient lands new ruins were added to the old and structures that had for centuries resisted the buffetings of Time collapsed in seconds when exposed to the fury of man. But sometimes an exploding shell or bursting bomb would, like a gigantic broom, sweep away the encrustations of ages, lay bare fragments of buildings not known to have existed and open new vistas to archeologists. By such a happy disaster the collection of huts called Mesra was blown to dust and in its place stood revealed the remains of some ancient buildings. When the war ended exploration began. Beneath a heap of rubble was found a stone chest, well sealed, and within it a number of documents varying in age and material. Amongst them was one of a peculiar texture somewhat like parchment and obviously derived from the skin of an animal. From the nature of the material and the site of its discovery this document is known as the Skin of Mesra. We are glad to be able to give you its translation).

Now it came to pass that on the 25th day of the month Ab there came to me at my place of healing a youth who was sore distraught. And I said unto him, What aileth thee? And he answered me saying Alas I know not but verily it is as if the finger of Death were upon me for my head poundeth and there is upon it a great pressure, and my heart leapeth within my bosom and teareth at its strings, and meat turneth to ashes in my mouth nor doth good wine please me but is as vinegar. Moreover my belly is filled with wind which roareth from me at both ends and, alas that I should say it, my natural power hath left me so that I am become as a withered tree that can bear no fruit.

And he spake further, and I questioned him and when I had done so I bade him strip himself of his raiment so that I might look upon him. And when he was naked I looked upon his eyes and his mouth, and I laid my ear upon his bosom and hearkened unto the sounds therein, and I laid my hand upon his belly and stroked it with the nail of my finger and verily his navel lept at my touch, and I smote him upon the sinews of his knees and his feet went forth as when one kicketh. And I bade him stretch forth his hands and lo the fingers thereof quivered as do the leaves of the scyamore tree when the wind breatheth upon them in the evening. And I looked also upon his water and saw that it was the water of health.

Now, when I had done these things, I bade him put on his garments while I reasoned upon the matter. And I said within myself Verily, here is a goodly youth who hath upon him no sign of disease, wherefore then is he so distressed? And I said peradventure he aileth not in his body but in his mind, having within him some grievous care to which he hath not given utterance. I will inquire further upon the matter.

So when he was seated before me I said unto him, What is thy name and whom dost thou serve? And he answered me saying I am David the son of Ephraim that was thy friend and I serve Levi the wine merchant in the Street of the Prophets. And I remembered Ephraim that was my friend and felt kindly toward the youth. And I said unto him How long hast thou served Levi? And he answered Since I was a stripling until now that I am a score and six years old which is to say the space of 10 years. And I said unto him Hast thou prospered in thy employment? And he made answer saying Verily not as I should for when I first served Levi he had but a few skins and the wine therein was sour so that he had but little custom. And Levi said unto me Thou are an apt youth and peradventure thou canst help me to prosper and verily if thou doest so I shall reward thee by making thee my chief steward. And so I journeyed unto those who press the grapes and to them that send wine into far countries and now Levi hath many skins and the wine therein is sweet and he hath a great custom yet hath he not made me his chief steward. And I said unto him Hast thou a wife? and he said Yea verily. And I asked him saying What thinketh she about this matter? And for a while he was silent and then he answered saying Sarah my wife is fair to look upon and is unto me as the apple of mine eye yet hath she a shrewish tongue upon this matter and calleth me a fool whom Levi hath deluded.

Now I saw that herein he was distressed and thought that peradventure I had touched upon the reason wherefore he was distraught. So I said unto him Hast thou not reminded Levi of his promise? And he answered me saying Yea times without number have I spoken unto him yet he sayeth only The time is not fitting. Come unto me again and we shall speak upon the matter. And it came to pass upon the day after the Feast of Weeks he called me to him and with him was Reuben the brother of his wife and he sayeth unto me Thou knowest that of all my servants thou are nearest my heart but they of my blood must needs be closer. Now Reuben the brother of my wife hath come to dwell with us and him have I made my chief steward yet in all things thou shalt be next to him. Now I had heard of Reuben that he knew not good wine from the voidings of camels and I was wroth. Verily my wrath was

so great that no sounds would come from my mouth and I would have smitten Levi but that in my limbs there was no power and I turned from them and went into the court yard and spewed.

Then I said within myself He said unto me that he had ailed about the space of two months. Now this is the month Ab and the Feast of Weeks was in the month Sivan peradventure herein lay the beginning of his sickness. Yet there must be other things where of he has not yet spoken, for wherefore doth his heart leap and wherefore hath he lost his natural strength. So I said unto him What else hast thou to tell me? And he said Master, that is all. And I said unto him Didst thou return to thy work? And he said Yea, albeit Reuben did seek to use me and the others smiled behind their hands, and for a while Sarah my wife spake not to me.

Then said I unto him When didst thy heart first leap within thy bosom? And he answered not for a season and then said, I do not remember. And I said unto him When did thy natural power leave thee? And his face became red and he said I knew it not until last night. And I asked him saying How long hath it been absent? And he said I know not. And as he spake he was uneasy and I knew that here was a matter for me to dwell upon. So I said unto him How cometh that to be so, lieth thou not with thy wife? And he said unto me Not since the Feast of Weeks. And I said within myself Behold this youth is young and lusty wherefore lieth he by himself? And I knew that he had not told me all. So I said unto him, Tell me all that I should know. And he answered me saying, Verily Master I have told thee all. But I knew that this was not so, and I said unto him again, Is there naught else that I should know? And he paused and then said, I have told thee all.

And for a while I pondered upon the matter. Then said I unto him Put thy shoe from off thy foot. And when he had done so I put a pebble in his shoe and bade him put it on and walk. And as he walked he limped and I said unto him Behold, thou limpest in thy walk. And he said Yea verily, it is by reason of the small stone that thou didst put in my shoe. And I said Yea, it is even so. And I said again Knowest thou how thou canst again walk as aforetime? And he answered saying Yea, by removing the stone. And I said Yea it is even so, and bade him be seated.

And when he was seated I said unto him My son, thou knowest wherefore thou didst limp and how thou canst be made to walk straight again. Know also that thou hast within thee a great fear and peradventure a great shame which are, as it were, great stones which lie upon thy head and upon thy heart and are as millstones about thy neck. Of these must thou be rid if thou wouldst be well. And he answered me saying, Maste thou speakest in riddles so that I understand the not. And I said unto him I would have thee te me what dost thou fear and of what art tho ashamed. And when he answered not I dre near to him and looked upon his face and sa unto him, My son, hast thou been with a strang woman?

And when I said that there came upon his fac the look of fear and he said Alas, alas, then it as I feared. The botch of the Hittites is upo me. Oh master cans't thou heal me? And he wa in great anguish. And I said unto him Verily thought not amiss when I said within myself tho hadst not told me all that was in thy mind. Te me now those things that I should know for veri in no other way canst thou be healed.

And he said unto me Truly Master tho knowest all things and from thee nothing is hi It is even as thou hast said. Unto me no woma is like unto Sarah my wife and my love for he is deeper than the wells of Tinzah yet hath sh a shrewish tongue. After Levi had told me tha he had taken for his chief steward Reuben th brother of his wife I returned home. And Sara my wife saw that I was sorrowful and asked m wherefore I was sad and I told her. And whe I had told her she was consumed by anger an spake to me in scorn and raised her voice an deaved me with her speech until I could bear no longer but fled into the street. And I wandere about not knowing whither I was going and whe night fell I saw that I stood before an inn and entered and sate me down. And a maid servan brought me wine and I did drink and I did drin again and thereafter I know not what happene unto me. But on the morrow when I awoke be hold I lay upon a strange bed and by me was a harlot. And I saw that I had been exceedin drunken for she was old and ugly having but on eye and few teeth. And when I looked upon he there came over me a great loathing so that spewed. And I gathered together my garment and fled.

And as I drew near unto my house a thoug smote me and I said within myself What shall say unto Sarah my wife? How can I tell her where I have been? And my heart leaped within m bosom and there came upon me a sweat and th joints of my knees were loosened so that the smote the one against the other. And I could g no farther but needs was forced to seat me by th wayside. And after a season my strength returne and when I came close unto my house I watche but saw no one and I entered as though I were thief and went unto the house top and laid m down.

And when I had been there for the space o about an hour Sarah my wife came upon the hous

top and saw me and said So this is where thou hast been. Verily I thought that thou were with another woman. And when she said this my heart did leap again. And she said What aileth thee? And I answered her saying There is a fever upon me and my head acheth. Leave me I prithee for peradventure I may sleep. And she offered me food but I would have none of it but drink only.

And thereafter I returned to work yet had I no pleasure therein and at night I lay upon the house top for I knew not what manner of plague might be upon me from lying with the harlot and I would not that Sarah my wife should suffer. But last night as I lay upon the house top there came unto me Sarah my wife and she spake sweetly unto me saying Wherefore liest thou alone and no longer comest unto me in our chamber as thy wont? Feelest thou no longer the need of me? And she lay down beside me and made that I should embrace her. And behold I could not, for my strength was gone, yea my natural power had left me and I was no longer a man. And there came to me the words of the scripture, "As an eunuch embraceth a virgin and groaneth" and I groaned for that I had become as an eunuch. Now when Sarah my wife saw this she put me from her and rose up quickly and was exceeding wroth. And she spake bitterly saying Verily for long enough have I known thee to be a fool but now it seemeth thou art not even a man. And she covered her face with her hands and fled from me weeping.

And when she had gone I lay in anguish upon my bed. And I too would have wept for mine eyes were as balls of fire in their sockets yet came there no tears. And I rose groaning and cried out What shall I do? What shall I do? For verily there is upon me the botch of the Hittites and it hath smitten me in my loins and in my secret places and hath taken from me my strength. And it hath smitten also my heart and my bowels and with it am I rotten. And I cursed the harlot and my drunkenness and the hour wherein I was born. And I went to the edge of the house top and would have cast myself down but that I feared I might not so die.

And I cried What shall I do? Shall I go to the physician? And I thought of thee that was the friend of Ephraim my father. And I said within myself Verily if I go unto him and say what is in my mind he will spit upon me and bid his servants drive me forth. Yet so great was mine anguish that I said unto myself, Verily I will go unto him and if he drives me from him then will I go unto an high place and cast myself down for it were better that I be dead than as I now am. And behold, Master, I have come to thee and I have told thee all.

And when he had finished I said naught for a short season and then I said unto him Put again thy shoe from off thy foot. And when he had done so I took from his shoe the small stone and cast it away. Then said I unto him My son, even as I have cast away this small stone so hast thou cast away the greater stones which lay upon thee and were as millstones about thy neck. And he said Yea, Master, it is even so for I feel as if a great load had been lifted from me but canst thou heal me? And I answered him saying, My son, thou hast not upon thee the botch of the Hittites or any other thing but art sound in all thy parts. And he said unto me But what of the harlot and the loss of my power? And I answered him saying Wine provoketh mightily unto lust yet doth it prevent the accomplishment thereof Though thou didst lie with the harlot yet knewest thou her not and so thou art without scathe. Yet, because thou dost love Sarah thy wife thou didst fear that the botch of the Hittites was upon thee and did fear likewise to be with her for thou weret filled with shame. Now is there no longer any need to fear for thou are clean and without fault. And when I said this he made a great sigh and his face was that of one who is contented. And I said unto him I counsel thee, serve no longer Levi and Reuben for with them thou shalt not prosper. And I made a writing and gave it unto him saying Take this writing unto Nathan of Damascus where he lieth at the inn hard by the Joppa Gate and tell him I sent thee. I know that he hath need of one such as thou and well he knoweth how to reward them that give him faithful service. And when thou art returning unto thy house tarry at the shops of the merchants and purchase some trifle such as women favour and peradventure some sweet meats also, and give them unto Sarah thy wife and tell her what Nathan shall say unto thee and speak comfortably unto her. And give her gifts from time to time and seek her counsel upon thy affairs for verily such things will do much to take the sting out of a shrewish tongue. And now, my son, go, and the God of Abraham our father be with thee.

And when I had said these things I stood upon my feet and David the son of Ephraim rose also and he said, Verily from the loins of my father came I forth and from him have I my life yet art thou unto me as a second father for thou hast given me my life again. And he stretched forth his arms and put them about me and embraced me and I felt the wetness of his tears upon my cheek. And he put his hand into his robe and brought forth a purse. And I knew the purse for it had been Ephraim his father's and within it was a rich jewel which was his chief inheritance. And he would have given it unto me but I said Nay, do not this thing for I am old and full of years and

have all the wealth whereof I shall ever have need. And moreover thou hast already paid me. And he said unto me Master, how can I have paid thee, I have given thee no gold. And I looked upon him and said, My son, gold is rich and jewels are precious but who shall set a price upon the kiss or upon the tear that cometh from a full heart? And now my son, tarry no longer but be upon thy way and peradventure thou shalt tell me at a later season how it hath fared with thee. And he departed.

Pathologist Convention

Report of Annual Convention (Conjoint) of the College of American Pathologists and the American Society of Clinical Pathologists

Submitted by T. H. Williams
M.D., C.M., D.T.M. & H. (Eng.), F.C.A.P.
Director of Laboratories, Deer Lodge Hospital
Winnipeg, Manitoba

The Convention was held at Chicago, Oct. 27 to 30th in the Drake Hotel on Lakeshore Drive with some of the demonstrations at the College of Medicine, University of Illinois.

Monday forenoon there were a series of demonstrations at the College of Medicine which included:

(1) Sternal Puncture technique.

(2) Technical Problems in Rh tests and in the Diagnosis of Obscure Haemolytic Transfusion Reactions.

(3) A Demonstration of the Electronic Microscope.

(4) Demonstration of Photelometric Analytical Methods.

The formal Convocation of the College was held Monday evening in the Auditorium of the American College of Surgeons when fellowships and memberships were conferred. This was followed by an able address by Frank Mann, A.B., M.D., A.M., Sc.D., L.L.D., Founder and Director of the Institute of Experimental Medicine at the Mayo Clinic, Rochester, Minn. He stressed the importance of the basic type of research done in the quest of new knowledge.

Tuesday and Wednesday were devoted to scientific papers and discussions which included the following and others.

Evaluation of Papanicolaou's Method of Cancer Diagnosis, Dr. B. Wiles and Dr. A. C. Hellwig.

Points brought out by the authors were:

(1) In the hands of the most skilful the method has a 20% error.

(2) It does not allow of proof of invasiveness of cancer cells, which is often one of the chief proofs of malignancy.

(3) It has to be made on single cells isolated from their surroundings.

(4) All changes seen in cancer cells are duplicated in other cells during some conditions such as inflammatory stimulation.

(5) The method is not generally acceptable or advisable since it requires the development of very special technique and skill found only in larger specialized centres.

Malignant cells are diagnosed by oversize and deep color of nuclei and the presence of nucleoli. Normal cell variations must first be well known. The increase in proportion of the size of the nucleus to the total cell is most evident in flat cells such as squamous epithelium and least evident in globular cells.

In searching for malignant cells in aspirated material from the bronchi it is best to prepare unfixed dried smear and stain with Wright's or other blood stain.

In the general discussion which followed further observations were brought out:

Since early diagnosis offers the best hope for success in cancer treatment constant effort is being made to improve and accelerate diagnosis. In a popular magazine recently it was advocated that all women of cancer age be tested by the Papanicolaou method. This is both impractical and pernicious. 14% of Cancer of the cervix is in women under 35 years. To carry out one survey of all American women in the cancer age range would require the full time services of 9,000 skilled pathologists. It would be pernicious because of a false sense of security resulting in failure to report when symptoms supervene after a negative test report. In a series of 5,000 consecutive gynecology patients surveyed by this method the positives picked up equalled 1/10 of 1 per cent only.

Finally it was agreed that no special benefit is inherent in this method as equally good results may be obtained with the usual H & E stains.

Malignant Melanoma of the Skin, 75 Cases, by Dr. L. V. Ackerman, Columbia, Mo.

Malignant Melanoma (Melanotic sarcoma, Melanotic carcinoma) are equal to 1 in 40 of all skin tumors. Pigment may be very evident or very hard to find and must be differentiated from iron pigment. Pigmented tumors of the foot must be regarded as malignant melanoma unless proved otherwise, which is infrequent. One-third of all malignant melanoma are found on the lower extremities below the knee level. The flat naevus is a more usual precursor of malignancy than the papillary naevus and hair is unusual in the malignant type. Fungating growths at the end of fingers or toes are likely to be malignant melanoma. The cell pattern is very pleomorphic and often the cancer cells are seen nested into a reticular fishnet type of stroma.

Treatment—Meddling treatment by too narrow excision, cautery, etc., is pernicious. Radiation is of no value. Radical surgical excision or amputation is the only satisfactory treatment and sufficient 5-year cures result to make this procedure worth while.

Sarcoidosis—A Clinico Pathological Review of 300 Cases, Including 22 Autopsies, by Dr. Walter Ricker, Seattle, Wash.

The character of sarcoidosis is under considerable dispute.

The lesions consist of accumulations of epithelioid cells usually in lymphoid structures but may be found in other places notably in the lungs, bones and liver. There is concomitant elevation of globulins in the blood. The lesions consist of monotonous repetition of discrete collections of epithelioid cells. Often there are giant cells and often there may be found inclusion bodies the so called Asteroids or Schellmont bodies. These are not true giant cells and appear to be formed by the crystallization of super-saturated solution of fatty acids probably Palmatin and (or) Steatin, Necrosis of the central area is not common but does occur and when seen differs from T.B. caseation. Regression is by fibrosis. The course is benign and prolonged and self limiting in 3 to 5 years.

Three of the autopsy cases showed tuberculosis following a reversal of the usual negative tuberculin reaction found with Sarcoidosis.

The etiology of Sarcoidosis is still obscure but the author believes it is probably allergic.

A Survey of the Accuracy of Chemical Analyses in Clinical Laboratories — Reported by Dr. Wm. P. Beek and Dr. F. W. Sunderman

This report appears in full in November issue of Amer. Jour. of Clin. Pathology. The survey was undertaken by the Committee on Laboratories of the Medical Society of the State of Pennsylvania. Carefully prepared identical solutions for analyses were distributed to 59 laboratories of all grades in the state. Results of determinations were sent to the Committee and compared with the known content of the solutions sent out.

These solutions were 2 aqueous solutions of glucose, 3 of chloride, 2 of urea, and 2 of calcium in concentrations comparable to those found in human blood. Also one sample of serum for measurement of total protein, albumin and globulin and two samples of citrated whole blood for the measurement of haemoglobin concentration.

In no laboratory were the determinations all correct.

With a prepared solution of urea of 9 mg./100 ml. the results reported varied from 3 mg./100 ml. to 22 mg./100 ml. and 2 reports were even higher.

Electrophotometric determinations of haemoglobin varied more widely than did the Sahli type of instrument. This was probably due to lack of proper individual calibration of instruments.

After receipt of these unsatisfactory results a questionnaire was sent to the clinical pathologists of the state requesting their opinions of the causes of the inferior laboratory work indicated by the survey. Some of the causes mentioned were:

Poor training of technicians	82 replies
Too few technicians	80 replies
Lack of understanding with technicians	64 replies
Poor equipment	63 replies
Too crowded floor space	57 replies
Other factors—inadequate orderly or secretarial staff	39 replies

In discussion which followed the paper the following remedies were suggested:

Self examination as to accuracy should replace complacency.

The survey should be continued during the coming year.

There should be established a Central Bureau for Clinical Laboratory standards to which solutions could be sent for expert determinations and comparison with those obtained by the laboratory enquiring.

Directors must take personal interest and not turn over tests too completely to technicians.

Single determinations must not replace duplicate ones for check.

Short cuts are usually not reliable and should be discouraged in practice.

Laboratories should not be satisfied with biochemistry technicians but should employ qualified biochemists. Such a biochemist may have supervision of more than one laboratory in a group of hospitals.

These remedies were approved and action is being taken to repeat the survey and to explore the possibility of setting up a Central Bureau of Standards.

The Use of Plasma in Hypoproteinemias by Dr. Max. M. Strumia

Intravenous plasma given to operative cases before and after operation was found definitely beneficial though examination of blood plasma did not show a rise of protein content. The explanation is that the added plasma is held in the tissues.

It has been shown possible to maintain plasma proteins in the presence of negative balance intake by the intravenous injection of plasma.

Lowering of blood proteins developing in hospital patients is more often due to insufficient intake than to infection results.

The discussion voiced severe criticism of hospital dietetics.

Hyaluronidase: An Enzyme Essential for Human Fertility, by Raphael Kurzrok

A sufficient content of hyaluronidase is required in semen to dissolve the protecting jell which surrounds the ovum before the sperm can penetrate.

A total sperm count of 100 million per cc. always contains enough hyaluronidase. Sperm counts below 50 million per cc. do not contain sufficient hyaluronidase. Semen may be normal in other ways but deficient in hyaluronidase. Such semen with added hyaluronidase has been used to successfully induce pregnancy by artifical insemination. Sexual abstinence does not increase the amount of hyaluronidase unless sperm are materially increased.

Hyaluronidase is estimated by use of hyaluronidic acid ring test with plasma.

There is no solution to many sterile couples. It is estimated that in 1/3 the defect is in the female; in 1/3 it is in the male; in 1/3 it is undiscoverable.

The religious and ethical barriers to artificial insemination were mentioned.

The Diagnosis of Histoplasmosis in Ulcerative Lesions of the Oral Cavity, by Dr. L. A. Weed and Dr. Edith M. Parkhill, Rochester, Minn.

Histoplasmosis first noted in the Canal Zone has now been reported from all parts of the United States, the Philippines, Honduras and Brazil. The authors stressed that in obscure cases of ulcerative lesions of the oral cavity when histological examination is not diagnostically specific culture for fungi especially Histoplasm capsulatum should be done. The organisms in the lesions are found in granulomatous giant cells and can easily be mistaken for Leishman-Donovan bodies but show budding and no nucleus or parabasal body. The oral lesions resemble tuberculous or cancerous lesions. Culture should be made from tissue biopsy specimens using penicillin and streptomycin to inhibit other organisms present. Histoplasma and most other fungi are not inhibited but Actinomyces and Nocardia are inhibited by penicillin.

Tissue sections for histoplasma are best stained by Gram's method. Histoplasma is a virulent organism. Guinea pigs are susceptible. The histologic pattern of the lesions is not yet well defined. Many fungi leave acid fast remnants in tissues and have been wrongly considered T.B.

All patients in the series died.

Symposium on Cardiolypin Antigen by Several Investigators

Cardiolypin is a light yellow crystallin substance extracted from fresh heart muscle which is clear in solution and stable and used for syphi flocculation tests.

A large series of tests were done compar Cardiolypin antigen with Kline-Kahn-Eagle, M zini and Wasserman, and others. It was gener agreed that Cardiolypin was more sensitive positive cases and less likely to give false positiv The uniformity of manufactured batches of Car lypin is so constant that it is proposed the P Food and Drug Bureau issue it under a pure fo guarantee. However, the test requires cardiolyp plus lecithin and the latter is not so constant potency titre but well within levels of depe ability. It was agreed that:

Cardiolypin flocculation is easier to work wi

Cardiolypin flocculation provides higher sen tivity.

Cardiolypin flocculation has the most unvar ing specificity yet developed.

Cardiolypin flocculation is likely to beco widely used, if provision can be made fo reliab sources of well standardized antigens.

In general discussion it was stated that Ka test is at present the most used test but has ma forms and combinations and sensitivity titres c be carried too far.

Cardiolypin—Lecithin test also is called Par born test.

New York State requires W.R. for diagno but allows flocculation tests for treatment contro

Diseases of the Kidney

A Seminar discussion on Diseases of the Ki ney was held all day Thursday, conducted Dr. Baldwin Lucke, of Philadelphia; Dr. Arth C. Allen, of New York, and Dr. I. Davidsohn, Chicago. This was extremely interesting and i formative and to many of those attending w the highlight of the convention. It requires to participated in to be appreciated.

BOOK REVIEW

An Introduction to Electrocardiograph

Illustrative Electrocardiography, by Julius Be stein, M.D. Visiting Electrocardiographer a Chief of the Cardiac Clinic, Morrisani, a City Ho pital, New York; Associate Cardiologist and Chi of the Cardiac Clinic, Jewish Memorial Hospit New York, and Nathan Bloom, M.D., F.A.C.P. Associate Professor of Medicine and Chief of th Department of Electrocardiography, Medical C lege of Virginia, Richmond. Published by App ton-Century-Crofts, Inc. New York 1, New Yo Price $???. $6.00

There was a time when the radiologist's say was accepted by the doctor who himself was s dom qualified to examine the films critically.

somewhat similar state of affairs exists today in regard to electrocardiograms. Yet a general knowledge of electrocardiography is even more necessary than a knowledge of radiology for this reason that only when familiarity with the clinical condition of the patient is added to the information afforded by the tracing, only then is interpretation likely to be accurate. The cardiographer can give his impressions of what he sees but these may be imperfect or even inaccurate if he has no clinical data to help him.

The doctor who wishes to become familiar with electrocardiography wants a small book with a minimum of theory and a maximum of illustrative material. That is exactly what he gets in Illustrative Electrocardiography by Burstein and Bloom. The fact that the book is now in its third edition is evidence that it has been found useful.

It is a volume of somewhat over 300 pages divided into 16 chapters which cover the Fundamentals of Electrocardiography, the Normal Electrocardiogram and Disturbances of the Pace Marker, Premature Contractions, Paroxysmal Tachycardias, Flutter and Fibrillation, Auriculoventricular Block, Bundle Branch Block, S-T and T abnormalities, the Electrocardiogram in Myocardial Infarction, Venticular Strain, the Electrocardiogram in Pericarditis, the Effects of Drugs, etc., the Precordial Leads, the Phonocardiogram, Multiple Abnormalities, Stokes-Adams Syndrome, Rheumatic Fever, etc. There is also a chapter on Radiology of the Heart.

In each case the chapter begins with a few pages of text in which the subject is discussed and this is followed by several illustrative examples. The cardiograms are of full size and are very clear. They are printed on the right hand page while the interpretation occupies the left hand page. In all there are 99 plates several of which contain two or even three tracings. All the common and some of the less common conditions are illustrated. The same applies to the radiological section.

A previous reviewer has referred to an earlier edition as "a real post-graduate course that can be pursued at home." The new edition is even better than the earlier ones. The plates are practically all new. A few evenings of study will more than suffice to give a good foundation and if the tracings of patients under care are studied along with this book a good understanding of the subject can be acquired.

EDITORIAL

J. C. Hossack, M.D., C.M. (Man.), Editor

What Can Be Done for an Addict?

I have in mind a young woman who has a good deal of arthritis and painful ailments elsewhere. Furthermore she had suffered from tuberculosis. For some time she had been getting relief by the use of morphine which the nature of her employment made procurable with little difficulty. But her symptoms were not chiefly due to her organic ailments. She lived in a state of fear. She was afraid that her lungs might break down, that the arthritis might cripple her completely, that her general condition was worse than she was told. But above all she feared discovery and what might follow it. She knew that discovery was inevitable and sure enough she was found out. Her employer, more anxious to help her than to throw her out asked what could be done.

What can be done for an addict? Where is he welcome or how can be be treated? Our attitude towards him is paradoxical. In every other sort of illness our desire to help is earnest and deep. We pride ourselves in treating alike all who seek our aid, whatever may be their colour, or creed, or caste, or race. We may not approve of their morals but we do not stress the point nor do we refuse treatment on that account. But in the case of an addict our attitude is completely different. Somehow we see before us not a patient but a criminal. We cut the interview short and leave him without help of any sort.

Yet he or she is a sick person and as such deserves help. To be sure crime and addiction are near allied but not all criminals are addicts nor are all addicts criminals. Addiction must often lead to a life of crime for, with morphine at $20.00 a grain how can anyone honestly earn that extra sum in addition to money necessary for food, clothing and shelter.

I understand that there are 8,000 addicts in Canada. I wonder how much they cost this province and the Dominion. There is the loss from their crimes, the cost of detection, of trial, of imprisonment. All together it must add up to a large sum. It would be less expensive to supply addicts freely with their drug. But the chief loss is in wasted lives, and the wisest course would seem to have clinics to which addicts could be referred and where they could get their drug if necessary but where they could also get medical psychological, physical, and above all, economic and social help.

There is no essential difference in the personalities of the alcoholic and of the morphine, heroin or cocaine addict. All are psychologically shorn lambs who seek to temper the winds of adversity by the use of the drug most suited to their individual needs. Because of the underlying personality defect we say that such patients are incurable. The same thing was formerly said of alcoholism, but the experience of Alcoholics Anonymous has proven that very many drunkards can be re-established in society and lead good and useful lives. Every day tens of thousands of men, women and children thank God from the bottom of their hearts for the hope and the help given them by this group.

The plight of the drug addict is far worse than that of the chronic alcoholic. Liquor can be obtained easily and legally. It has for ages been a medium of hospitality. Occasional or frequent overindulgence is a common fault that is largely condoned. But none of these things apply to morphine or heroin. The user of these drugs is looked upon as a moral leper beyond, and in any case unworthy, of help. Re-establishment, is for him, exceedingly difficult and honest employment especially hard to find for one who has been at any time in the toils of the law.

The success of those who have fought addiction to alcohol shows that redemption is not impossible for those who are addicted to other drugs. It is not excessively difficult to cure addicts using the word "cure" in the sense that desire for the drug is lost. But maintaining the cure is very difficult for the reason that the ex-addict tends, or is forced, to return to his old associates and associations which, when bad as they often are, leads to relapse. When adversity strikes often and hard they seek the solace of their drug, "They beat me and I felt it not, I will turn to it yet again."

It is a reflection upon us as a profession that we neglect and ignore this form of sickness. Though not as universal it is no more immoral and is socially as dangerous as venereal infections. These we treat for the benefit of the community, why not treat drug addiction on the same basis?

Obituaries

Dr. George Forrest Weatherhead

Dr. George Forrest Weatherhead died on March 5 at his residence in Winnipeg. Born in Brockville, Ontario, 74 years ago, Dr. Weatherhead graduated in medicine from Queen's University in 1902. He came to Winnipeg in 1907 and practised here and at Winkler, Manitoba.

In World War I he served overseas with the C.A.M.C. and returned to Webb, Sask. He acted as medical superintendent of the Ile a la Crosse Hospital until 1934 when he retired on account of illness.

In his younger days he was an excellent tennis player and was champion of Manitoba. He is survived by his widow, three sons and four daughters.

SOCIAL NEWS

Reported by K. Borthwick-Leslie, M.D.

Dr. L. T. Ainley was honored at a banquet, with presentation by members of the Pension Commission and D.V.A., on his retirement as Senior Medical Examiner. His cheerful, sympathetic presence will be missed by all, particularly the "boys."

♦

Congratulations to Dr. Marcel Blanchaer, of the Medical College Staff on having received a research grant from the Marble Foundation, New York. He will do his research in Biochemistry.

♦

Dr. Roper Cadham, having resigned his post as Provincial Bacteriologist, has been reappointed to the City Health Department. Apparently following in "Father's Footsteps" doesn't always work out.

♦

It was pleasant and instructive to have our old friend Dr. Perry McCullagh, Cleveland, speak to the Winnipeg Medical Society. I am sure our representatives to the American College of Surgeons Meetings in Minneapolis, Doctors Coppinger and Thorlakson, were as enthusiastically received.

♦

Congratulations to Alvin Blondal on his marriage to Miss Marjorie Waterhouse. Good luck to my favorite "Juniors!" Also good luck, Al, in the new radio appointment.

♦

Dr. Maurice Berger reports a good time and excellent work in his recent P.G. course in Pediatrics at the University of Minnesota.

♦

At an impressive function at the Children's Hospital, Drs. J. McGillivray, Gordon Chown and O. J. Day were honored for their years of service on the hospital staff. A total of 93 years service between them makes one feel rather overwhelmed.

♦

Is Jack Waugh photogenic? And how! Also he is very much appreciated by all the hockey clubs, as proven by the presentation party for him. I would love to have seen that "blushing valedictorian" reply to the toast.

♦

Congratulations to Grandfather J. D. Adamson. I wonder if he was any prouder of his own first born?

♦

Congratulations to Dr. Mary Speechly, who has been voted a life membership in the University Women's Club.

Our sincere sympathy to Dr. Fred McGuinness on the double loss of his mother and sister—and to the family of Dr. G. F. Weatherhead who died recently.

♦

Marriage vows were exchanged on March 23rd, in the Royal Alexandra Hotel, between Valli Jean, only daughter of Dr. and Mrs. Harry Portnuff, Yorkton, Saskatchewan, and Alexander, son of Mr. and Mrs. David Berman, Winnipeg. A reception, dinner and dance in the Gold Room followed the ceremony. The young couple will reside in Winnipeg after their trip to Chicago, New York and Eastern Canada.

♦

Dr. and Mrs. Eyjolfur Johnson, Selkirk, are vacationing at Banff. Other winter holiday wise people are Dr. and Mrs. C. M. Strong, back from motoring through the Southern States; Dr. and Mrs. W. A. Gardner, on a "second honeymoon" he says, in Florida; Dr. and Mrs. G. S. Fahrni, in Vancouver and Victoria; Dr. and Mrs. S. McInnes, also the Western Coast; Dr. Ida Armstrong, in Victoria. It's rather refreshing to have Ida insist that B.C. is a grand place to holiday in March, but to live, let's stay in Manitoba.

♦

Dr. and Mrs. Gordon Hunter announce the birth of Donald Gordon.

♦

Dr. and Mrs. Ian McLean announce the arrival of Elizabeth Ann.

♦

Dr. and Mrs. R. L. Willows announce the birth of Judith Elaine, January 14th. Sorry I missed this one last month.

♦

Dr. F. W. Jackson, recently returned from Geneva meetings of the World Health Organization, reports that Canada is to help train Medical Students from 35 countries in 1948. Where?

♦

To the Editor—Alas, my conscience shivers now that you draw my attention to the dire effects of that Hawaiian lassie on your good name. All I can say is that already have I been grouped, matched and Rh'd—so that the next transfusion you need—heaven forbid the necessity—I will be there, and behold the antidote for that excessive virtue will be automatic—no necessity for palate. Anyway, I'm sorry not to have come over to say "Hi"—Have been too busy getting myself and son reformed and transformed from good Presbyterians to better Anglicans. What these kids do to us!

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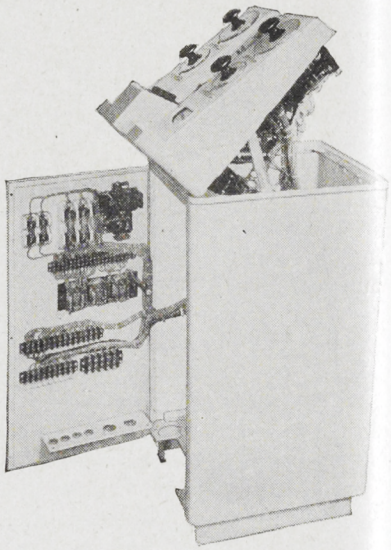

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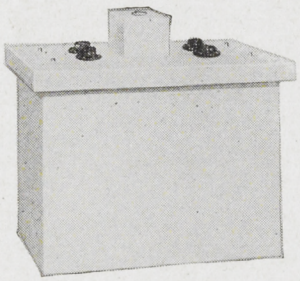
100 MA — 100 PKV

200 MA — 120 PKV

300 MA — 140 PKV

500 MA — 140 PKV



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GUARD THOSE YOU LOVE . . . . GIVE to conquor CANCER

CURRENT NOTES & NEWS

Reported by M. T. Macfarland, M.D.

Dr. Gerald Williams Memorial Scholarship

The Medical Staff of the Children's Hospital is establishing a fund for a scholarship for nurses as a tribute to the memory of the late Doctor Gerald Williams who, for many years, was Superintendent of the hospital.

The annual award has been tentatively set at $250.00 to assist the nurses chosen to carry out short term post-graduate study.

Curling Notes

Medical men were represented at the Winnipeg Bonspiel (with an all-time high of 454 rinks entered) by Drs. Gordon Fryer, Roy Martin and Boyd McTavish. Dr. Fryer played with a C.P.R. aggregation while Dr. Martin skipped a Strathcona four, and Dr. McTavish held the broom for a Pembina four. None of the contestants reached the prizes. However, Dr. Martin managed to win the Life Members' event, nosing out his confrere Dr. Bobby Black in the final game of the competition. Dr. James McTavish played lead in the Martin aggregation.

In the regular curling among the medicos at the Granite rink (Wednesdays at 12:30) the first half has been concluded, and Drs. Skaling and Kitchen tied for the leadership with one loss each. The play-off hasn't been arranged as yet.

Emergency Calls

In December last a communication from a municipality of Greater Winnipeg addressed to the Deputy Minister of Health and Public Welfare inquired whether a doctor was under obligation to answer emergency calls, or if the municipality had the right to know why such a call was refused. It was reported that on different occasions calls had been refused although the doctors called lived within one hundred yards of the patient, and before help was obtained, death occurred in each case. Additional information was requested from the municipality. The Hippocratic Oath does not compel acceptance of patients by doctors nor does it provide "conscience-salve" for cases in which assistance might reasonably have been expected. It has been the time-honoured opinion that members of the medical profession will usually sacrifice personal comfort and preference to answer the call of the needy. If calls come at three o'clock in the morning from distraught relatives who tell you that the case is emergent and in need of immediate attention, and if you find it impossible to accept the call, it would help considerably if you were to suggest one of your confreres who might be available, or advise the caller to contact the Directory when a suitable substitute might be secured.

Winnipeg Medical Society

One of the best attended of the year was a special meeting of the Society which was held on Friday evening, March 12th, when Dr. Perry McCullagh, Manitoba graduate of 1924, at present with the Department of Endocrinology of the Cleveland Clinic, Ohio, was the guest speaker on the subject "Climacteric—Male and Female." There was considerable reassurance for the audience which was predominantly male.

Complimentary Dinner to Dr. E. S. Moorhead

A complimentary dinner was tendered by members of the Board of Trustees to Dr. E. S. Moorhead on the occasion of his retirement as Medical Director of the Manitoba Medical Service. Various speakers testified to the contribution of Dr. Moorhead to the venture which was sponsored by the Manitoba Medical Association as a non-profit community medical service. A presentation was made to Dr. Moorhead, and it is the hope of his confreres that he will enjoy a well-merited vacation.

Manitoba Medical Service Discharges Indebtedness to Sponsors

A copy of the 1947 Financial Statement of the Manitoba Medical Service has been received — a bit late for inclusion in the present issue of the Review. Highlights of the Report are the facts that new office furniture and equipment necessitated by the setting up of an office apart from the Manitoba Hospital Service Association, have been purchased and paid for, payment of medical accounts have been on an increased pro rata basis and the balance of monies advanced by the College of Physicians and Surgeons, the Manitoba Medical Association, and the Winnipeg Medical Society have been repaid in full. Further evidence of the fact that definite progress has been made is the return to 130 medical members of demand notes which they had deposited at the inception of the plan, as practical evidence of faith in the venture. "Growing pains" there have been, but with informed and ethical co-operation on the part of those receiving and those rendering the service there are few problems which cannot be solved by men (and women) of good will.

C. P. & S. By-Election Result

As a result of the By-election in the South Winnipeg Constituency, Dr. D. L. Scott was elected a member of the Council of the College of Physicians and Surgeons, to complete the unexpired term of Dr. W. G. Campbell, was was obliged by ill health to sever a long connection with the College.

College of Physicians and Surgeons

A luncheon meeting of the Discipline and Education Committees of the College of Physicians and Surgeons was held in the Medical Arts Club Rooms at noon on Tuesday, February 17th. On the same evening a dinner meeting of the Executive Committee was presided over by the President, Dr. W. F. Stevenson, and a lengthy agenda was disposed of with alacrity.

C.A.M.S.I. Summer Employment Service

Letters have been received by various bodies concerning a summer employment service which has been instituted by the Canadian Association of Medical Students and Internes. The Secretary and Public Relations Officer of this under-graduate body have been most energetic in bringing the project to the attention of all who may require "apprentices" for the summer months. Preliminary lists are already posted on some of the College notice boards, and if there is any way in which further help may be given to those who seek during the summer to earn sufficient funds to pay for the subsequent year's tuition, your co-operation is earnestly solicited.

British Medical Association

The 1948 meeting of the British Medical Association will be held this year at Cambridge. The dates are June 25th to July 2nd, and further information may be secured by application to Miss Ruth Monk, at the Medical Library, Phone 29 545.

A Friend In Need

One of our members was heard to remark one day, on the occasion of a clinical luncheon, that as he left a hospital he had noticed that a car belonging to another doctor had a flat tire. Said he, "If there had been any way to find out to whom the car belonged, I might have given him a call, and the owner might have arranged to have the repair effected before he had completed his operation or rounds and was ready to leave the hospital." Well done, Dr. . . . , we can do with a good deal more of these small, yet all-important, common courtesies. An effort is being made to secure a list of car license numbers in the 4,000 series for use in such cases. Meantime, any well-intentioned person who called the issuer of auto licenses, Mr. G. V. Fanthorpe, at 907 349, or the Record Office, 907 278, and explained the situation would probably be given the required information.

Department of Health and Public Welfare

Comparisons Communicable Diseases — Manitoba (Whites and Indians)

DISEASES	1947 Jan. 25 to Feb. 21,'48	1947 Dec. 28,'47 to Jan. 24,'48	1946 Jan. 26,'47 to Feb. 22, '47	1946 Dec. 29,'46 to Jan. 25,'47	1947 Dec. 28,'47 to Feb. 21,'48	1946 Dec. 29,'46 to Feb. 22,'47
Anterior Poliomyelitis	0	0	0	0	0	0
Chickenpox	274	184	77	130	458	207
Diphtheria	1	2	10	12	3	22
Diphtheria Carriers	0	0	2	3	0	5
Dysentery—Amoebic	0	0	0	0	0	0
Dysentery—Bacillary	0	0	1	0	0	1
Erysipelas	1	3	6	5	4	11
Encephalitis	0	0	0	0	0	0
Influenza	3	1	12	4	4	16
Measles	43	15	1030	621	58	1651
Measles—German	10	10	4	0	20	4
Meningococcal Meningitis	1	0	3	1	1	4
Mumps	195	110	199	152	305	351
Ophthalmia Neonatorum	0	0	0	0	0	0
Pneumonia—Lobar	12	7	28	13	19	41
Puerperal Fever	0	0	0	0	0	0
Scarlet Fever	8	11	25	25	19	50
Septic Sore Throat	1	0	2	1	1	3
Smallpox	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0
Trachoma	0	0	0	0	0	0
Tuberculosis	118	17	36	16	135	52
Typhoid Fever	1	0	0	0	1	0
Typhoid Paratyphoid	0	0	0	0	0	0
Typhoid Carriers	0	0	1	0	0	1
Undulant Fever	0	0	1	0	0	1
Whooping Cough	39	56	81	52	95	133
Gonorrhoea	115	120	151	181	235	332
Syphilis	47	38	64	31	95	95
Diarrhoea and Enteritis, under 1 yr.	4	6	12	5	10	17

Four-week Period January 25 to February 21, 1948

DISEASES (White Cases Only)	*743,000 Manitoba	*906,000 Saskatchewan	*3,825,000 †Ontario	*2,962,000 Minnesota
*Approximate population.				
Anterior Poliomyelitis	....	2	....	2
Chickenpox	274	161	1368	....
Diarrhoea and Enteritis	4	....	....	....
Diphtheria	1	6	8	15
Dysentery—Amoebic	....	....	1	1
Dysentery—Bacillary	....	....	2	1
Erysipelas	1	1	5	....
Infectious Jaundice	....	....	5	....
Influenza	3	....	76	2
Malaria	....	....	....	3
Measles	43	46	3670	1500
Measles, German	10	2	141	....
Meningococcal Meningitis	1	2	4	4
Pneumonia Lobar	12	....	....	....
Mumps	195	219	918	....
Scarlet Fever	8	4	238	189
Septic Sore Throat	1	....	4	....
Trichinosis	....	....	1	....
Tuberculosis	118	40	91	93
Typhoid Fever	1	....	1	1
Undulant Fever	....	....	5	7
Whooping Cough	39	27	73	121
Gonorrhoea	115	....	215	....
Syphilis	47	....	153	....

† No report received from Ontario for week ending February 7th, 1948.

DEATHS FROM REPORTABLE DISEASES

For Four-Week Period January 28 to February 24, 1948

Urban—Cancer, 46; Pneumonia (other forms), 18; Syphilis, 2;Tuberculosis, 4; Hydatid Disease, 1; Hodgkin's Disease, 1; Diarrhoea and Enteritis (under one year), 1. Other deaths under 1 year, 21. Other deaths over 1 year, 174. Stillbirths, 11. Total, 206.

Rural—Cancer, 23; Influenza, 1; Pneumonia Lobar (108, 107, 109), 2; Pneumonia (other forms), 9; Tuberculosis, 4; Whooping Cough, 1; other diseases due to Spirochetes, 1; Diarrhoea and Enteritis (under one year), 4. Other deaths under 1 year, 16. Other deaths over 1 year, 125. Stillbirths, 6. Total, 147.

Indians—Pneumonia (other forms), 2; Tuberculosis, 2. Other deaths under 1 year, 0. Other deaths over 1 year, 1. Stillbirths, 0. Total, 1.

♦

Chickenpox is still epidemic in many parts of the province.
Diphtheria incidence remains low in Manitoba, to date this year. Long may this continue!

Mumps cases are quite prevalent at the present time.

♦

Actually, as far as communicable diseases are concerned, the health of the people of Manitoba has been excellent in the past eight weeks shown in this report. Of course the common cold has been troublesome and there have been a few cases of influenza but on the whole we have been fortunate.

Instruments For Sale

Hospital Instruments, excellent condition. Apply Dr. Roy P. Brown 501 Sargent Avenue, Phone 88 068.

Municipal Doctor Wanted

For practice in the Municipal Doctor Area in the Municipality of Argyle. Services to start on or about the 1st of May, 1948. Contract on form approved by the Department of Health and at salary schedule set out therein. Send all correspondence and inquiries to: R. Carl Atkins, Municipal Clerk, R.M. of Argyle, Baldur, Manitoba.